THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, VENTILATION, WATER SUPPLY AND DISTRIBUTION, & GENERAL SCIENCE.

VOLUME XLI.—No. 4. Whole No. 604. | NEW YORK, SATURDAY, AUGUST 16, 1884. | $3 PER ANNUM IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
JOS. R. THOMAS, C.E., Editor.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND CLASS MATTER.

Published on the 2d and 16th of each month, at No. 42 Pine Street, N. Y.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $3.50 (15 shillings—18 francs). All payments to be made in advance. Single copies, 15 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

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The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them.

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SETTLEMENT OF THE GAS QUESTION IN NEWARK, N. J.

For some time past negotiations have been pending between the public authorities of the city of Newark, N. J., and the representatives of the gas interests of that place, looking to an amicable settlement of the question of gas supply. These negotiations, and their outcome, must possess features of general interest to the fraternity at large; and, looking at the matter in this light, we are of opinion that the subject is of sufficient importance to warrant a reproduction in these columns of the salient points in the case. The gentlemen who represented the gas purveyor's side of the question (and particular mention should be made of the name of one of them—Mr. Eugene Vanderpool, of the Newark Gas Light Company) are entitled to great praise for the stand taken by them; and the people of the city of Newark are evidently disposed, strange though such a statement must seem to those knowing how the "good people" usually feel toward gas men in general, to the opinion that the guarantees made by the Municipality, in return for the concessions made by the gas companies, are eminently fair and just. At any rate, according to the terms of the agreement made between the city and the established companies, an exclusive contract has been signed, whereby the existing gas purveyors are protected for a term of 7½ years from the attacks of those who would, "by hook or by crook," seek to divide a business which had taken years of labor to bring to the point where it might become susceptible of yielding a fair remuneration to those who had the courage and pertinacity to struggle on in the hope of future reward. From a perusal of what follows it will be seen that this immunity has been gained only through an agreement on the part of the gas maker to fulfill certain conditions that will inure largely to the benefit of the gas consumer.

In 1877 a ten years' contract was entered into between the gas companies and the city, which was exclusive so far as the gas consumed in the lamps and public buildings was concerned. In 1883 the city applied to the companies for a reduction in the price of gas, and a modification of the existing contracts. The companies were willing to meet the views of the city, but insisted, if new arrangements were made, that they should be protected against the raids of gas pirates, or so-called competing companies.

The agitation was continued in the Common Council, and through the columns of the daily press, until a committee was appointed, in January, 1884, to confer with the companies in order to see what could be done. This committee proceeded at once to investigate the question of gas manufacture and distribution, and obtained data and information relating thereto from all parts of the country.

The result of their studies was a lengthy and unanimous report, showing the fallacy of competition in the supply of gas, and asking the Common Council to authorize them to conclude a contract with the existing companies, to run for a term of 12½ years, the basis of the contract to be—

1. Coal gas of a certain quality and price.
2. The price to be determined by arbitration every two years.

The Common Council were unwilling that a contract should be made for so long a time; but, by a vote of 19 to 4, instructed the lamp and gas committee to make a contract for 7½ years.

Every paper in the city commended this action of the Council in strong terms, but the Mayor vetoed the resolution of Council, as he thought it wiser to make annual contracts; but the Council overrode the veto by an almost unanimous vote.

As was anticipated, the discussion of the question in the Council and press

induced two bands of foreign speculators to turn up, and to make all kinds of offers so as to get a foothold and damage the existing companies. The twaddle and lies, so familiar to the conservative gas interests of the country, were freely used; the speculators could furnish far better, purer, and cheaper gas than the old companies, etc., etc.

This element, by means of false statements and a certain political strength, added much to the difficulty of the negotiations. One of these gangs, presuming, perhaps, that the conservative gas people in New Jersey were unaware of the methods pursued by the general run of gas pirates, had the supreme impudence to present the following petition, which is herewith given in order that others may judge of the operators who may appear elsewhere:

"To the Mayor and Common Council of the City of Newark, N. J.:

"Gentlemen—We, Geo. B. Inman, Willard F. Inman, S. S. Sargeant, Gottfried Krueger, Edward Schickhaus, M. R. Crew, E. F. Browning, do petition your honorable body to pass such an ordinance as to you may seem proper, and containing such conditions as you may deem necessary in the premises, allowing your petitioners, *or their assigns, provided they accept, within six months from this date*, the conditions your honorable body may see fit to impose, privilege and permission to open the ground in any street," etc., etc.

These people, with their retainers, appeared in force July 1st before the committee on lamps and gas, hoping the old companies were unaware of their movements; but they never made a greater mistake, as the result showed, as described in the JOURNAL of July 16.

This band then proceeded to obtain, by means of false statements, petitions from thousands of consumers and taxpayers praying the Common Council to grant them permission to open the streets. At the meeting of the Common Council (July 16) they were unanimously denied the right to open the streets, and their petitions were referred to the committee on lamps and gas, in whose hands they now silently slumber.

The companies insisted upon, and the city was willing to provide for, the exclusion of so-called competing companies. This feature has been embodied in the contract, so far as the best legal and engineering talent in the State could frame such an instrument. The contract fixes the prices as follows:

Lamps.—3,300 hours, with a 4-feet burner, $20 per annum; net price of gas, $1.21 per thousand. This is a reduction of over $10 per lamp.

Public buildings.—Gas reduced from $2.25 to $1.75 per thousand.

Private consumers.—Reduced from $2.50 to $1.80 per thousand.

These prices are fixed until July 1, 1888, when they are to be revised as follows:

"The above prices for furnishing gas to the city and to private consumers are to continue until July 1, 1888, and from that date until the same shall be changed in the following manner, viz.: The parties to this contract may, before that time, agree upon a different rate, which agreement shall be in writing, executed by the parties, and annexed to the present contract. If no such agreement, changing or fixing the prices, is made before the 31st day of July, 1888, then either party may give thirty days' notice to the other that it desires the prices to be fixed by arbitration; and the prices shall then be fixed without delay by three arbitrators—one to be selected by the Mayor, one by the gas company, and the third by these two so selected. The arbitrators shall be disinterested persons, and they shall determine the prices upon the following bases or elements:

"1. The cost per gross ton, delivered in Newark, of bituminous coal of the standard quality used for making gas, at the time of making this contract, and at the time of the arbitration.

"2. The rate paid in Newark at the said several times for the manual labor employed in gas works.

"3. The taxes imposed at said several times upon the gas- company.

"4. Inasmuch as the cost of coal, labor, and taxation covers but a part of the cost of making and delivering gas, the relation these separate elements shall bear to the entire cost to be determined by the arbitrators, shall be for coal 35 per centum, for labor 15 per centum, and for taxes 5 per centum.

"5. The prices for gas to be fixed by the arbitrators shall, as near as may be, bear the same relation to the prices fixed by this contract up to July 1, 1888, as the cost of gas at said time of arbitration, determined upon the above basis, shall bear to the present cost of gas on the same basis.

"The prices which may be thus agreed upon by the respective parties (or, in default of their agreement, then the prices fixed by the arbitrators), in the manner above mentioned, shall be the prices for the remainder of the term fixed by this contract, after July 1, 1888; if the prices are not agreed on, or the arbitrators fail to fix prices on or before said date, then the prices fixed by this contract are to govern and to be paid until said prices are so fixed; and, when so fixed, the prices are to relate back to the first day of July, 1888, and any excess received by the gas company is to be returned or accounted for, and any deficiency is to be made up by the city."

Among the features of the new contract we notice the following, and they are altogether admirable, particularly in the case of the city of Newark, where many miles of pipe have been laid for the benefit of the city, and on which lines of pipe there is not a single private consumer of gas—pipe, indeed, which does not return any interest whatever on its cost.

"It being understood by the parties that the effect of terminating the existing contract between them, by the execution and delivery of this present contract, is to require the gas company, for the residue of the term mentioned in the existing contract, to furnish an additional quantity of gas for the street lamps, to reduce the prices for gas furnished to the city and private consumers, and to surrender its present exclusive right to light the public lamps and buildings, and that the said concessions upon the part of the gas company are made upon the consideration that, during the term fixed by this present contract, no other gas company shall be allowed to furnish gas in a selected portion of said district, and thereby appropriate a remunerative portion of the business, while being relieved from the burdensome portion thereof, it is further expressly agreed:

"*First.* That during the term fixed by this contract the city will not allow any person or corporation, other than those now furnishing gas to the city, to open or use the streets of the city of Newark, or any portion thereof, for the purpose of distributing gas, except under the conditions and requirements that they shall lay pipes in all the streets of Newark, in which gas pipes are then laid, of equal size, length and capacity with those so laid, before they will be allowed to distribute gas; and further, that said pipes shall be laid as at present required by section 21 of the act entitled 'An act to authorize the formation of gas light companies and regulate the same,' approved April 21, 1876.

"*Second.* That if the city, during the term fixed by this present contract, shall so grant or allow the right and privilege of laying pipes to any other person or corporation, upon the said terms or otherwise, or if during the said term any other person or corporation than those now furnishing the city of Newark with gas, shall lay down in any of its streets pipes for furnishing gas, then the city shall reimburse and pay to the gas company the difference between the amount it is entitled to receive from the city under this present contract and the amount it would have received from the city under the existing contract, had that continued in force up to the time fixed in it for the termination thereof."

The effect of these sections in the contract is that, if the city should not live up to the understanding and spirit of the contract, and should permit a new company to open the streets, said new company, after compliance with the provisions and restrictions of the present gas law, known as the "Act to authorize the formation of gas light companies and regulate the same," would have to pay at least one hundred and twenty thousand dollars ($120,000) to the existing companies, and also expend not less than five hundred and fifty thousand dollars ($550,000) on street mains, before it could distribute one foot of gas.

This would not be a paying investment under any possible circumstances; and is bound to act as a dampener upon the ardency of the zeal of any one of the predatory bands so fond of marching along under the folds of the banner whereon is inscribed, "We work for the public good."

Since these contracts have become law we understand that the Newark Gas Light Company will immediately proceed to enlarge the capacity of its manufacturing plant. One of the prominent features of this enlargement will be the construction of a new retort house, provided with every requisite for the production of coal gas in the cheapest and best manner. There is already under way the erection of another gasholder, 130 feet in diameter, the calculated working capacity of which is to be 800,000 cubic feet.

Mr. Vanderpool, the President and Engineer of the Newark Gas Light Company, is a man who is conservative and progressive at one and the same time. He is conservative in so far as that he works in the light, differing in that respect from people who style themselves "progressive," and then in the same breath approach those in authority, sneaking and covertly, under the whining pretense of wishing to serve the people. It is time that the threadbare and time-serving pleas of such hypocrites were understood by the councilmen of even the smallest hamlets of the United States. Investors do not go into the gas business for any other purpose than that of making money; and the marauders who parade under the guise of philanthropists should be made to know that the mask is too gauzy, and will no longer serve to conceal their real object, which, in ninety-nine times out of a hundred, is simply a desire to plunder, or make an effort to plunder, the business of those who, in the years gone by, had to serve an apprenticeship to loss and privation, ere the growth of the country in wealth and numbers had made their position such as to recompense them for their former trials.

We can congratulate both the consumers and purveyors of gas in the city of Newark upon the consummation of this contract, and there cannot be the shadow of doubt that the arrangement will be of positive benefit to both classes. The consumer will obtain his gas at a low rate, and the stock-

holders will be guaranteed a fair and honest return upon their investment, besides being secured from the attacks of those who would like to destroy the value of that which their investment represents.

AFTER-THOUGHTS RELATING TO THE ST. LOUIS MEETING OF THE WESTERN GAS ASSOCIATION.

NUMBER IV.

The paper read to the Association, by Mr. Thos. Bates, of Cairo, Ill., plainly proved the author's familiarity with the details of his profession. The manager who can systematize his own time and labor will experience but little trouble in controlling and directing the movements of his assistants. Many engineers often claim that they have no time to look after the *little* details of their business—matters that in themselves often appear small, frequently excercise a greatly appreciable effect upon the yearly balance sheet.

"The Relation of Chemistry and Physics to the Manufacture of Illuminating Gas," was presented in a clear and impressive manner by Prof. Douglas. With due deference to the merits of the other papers, this was the most interesting one read before the Association; but while being so entertaining, all the statements contained therein do not appear quite clear in every particular to my befogged intellect.

In speaking of the process of the natural distillation of coals, as carried on within the bowels of the earth, he says: "These bituminous coals are undergoing a natural process of distillation, as is shown by the gradual emission of carburetted hydrogen, and passing into the authracite coals, and *finally the diamond.*" Does the Professor intend to teach us that eventually, if left undisturbed, our bituminous coals will be converted into diamonds?

He gives us a table of the gases produced at the various degrees of temperature, ranging from dull red to "continued white heat." This table shows a gradual diminution in the percentage of light-giving gases as the heat is increased. I do not understand that this table was made up from Professor Douglas's own laboratory experiments; he will not be offended, therefore, if its correctness is questioned. If to reduce the heat is to increase the illuminating power of the gases, why is not the "fire-damp," to which the author refers, the best possible illuminant? Certainly many superintendents run their retorts up to what is usually termed "white heat," and yet they succeed in making 15 to 17 candle gas.

The chemical and physical changes that occur in a gas flame are beautifully described, and he maintains the generally accepted—or, perhaps, better to say the popular—idea that there are only two compounds formed, water and CO_2. Some eminent experimenters question this, and incline to the belief that higher forms of compounds of the two gases result on the liberation and oxidation of portions of the hydrogen, and that much of the light is due to the increased density of the molecules so formed. That the density of the gases largely influences their luminosity, and that the Professor erred in saying that "all gas flames derive their light solely and entirely from the presence of carbon in the combustible gas," is proven by the experiments of Dr. Frankland, in obtaining light from burning pure hydrogen gas under pressure.

The leading constituents of coal gas are approximately given as 10 to 15 per cent. of hydrogen, 30 to 60 per cent. of marsh gas, and 4 to 5 per cent. of olefiant gas. If the author is giving his proportions by volume, he has given the quantity of hydrogen at one-third the quantity usually shown in the published analyses of coal gas. We will assume, then, that his proportions are by weight. He gets four and one-half feet to the pound, or 9,000 feet to the net ton, and his gas has an illuminating power of from 18 to 20 candles. Gas of that quality will not weigh *less* than one pound to 30 feet; thus we have $9{,}000 \div 30 = 300$ pounds of gas. We will give him the benefit of the doubt, and take the lowest figures—10 per cent.—for the weight of the hydrogen. Ten per cent. of 300 equals 30 pounds, or weight of the hydrogen. As eight pounds of oxygen are required to combine with one pound of hydrogen to form water, we would then have about the following result—if (as Prof. Douglas claims) all the hydrogen comes from the decomposition of water in the coal—

$8 \times 30 = 240$, weight of oxygen required, plus 30 pounds of hydrogen, which gives us 270 pounds of water. To this add the ammoniacal liquor obtained—say, at least, 130 pounds (probably much more)—and we have 400 pounds of water from 2,000 pounds of coal. Pretty damp coal?

Now as there is a very much larger per cent. of hydrogen in the gases that are generated during the last hour than is the case during the first three hours of the charge, is it not quite possible that Prof. Douglas is wrong as to the source of the free hydrogen?

The discussion which followed the presentation of Prof. Douglas's paper was very animated, and related mostly to the proper temperature for distillation in order to get the best results. Had I been umpiring the debate, I should have awarded the prize to the Professor, as he had, in my opinion, rather the best of the argument. However, I cannot agree with him in his assertion that the gas left in the coal, after extracting 4½ feet to the pound, is "worthless, and nothing short of an imposition or a fraud on the consumer, if extracted and offered for sale." The gas remaining is hydrogen, and, as such, is quite as good as the hydrogen that was driven off with the first 4½ feet; and, furthermore, if mixed with a sufficiency of the olefiant gases that are able to keep it up to the legal standard of 16 candles, or whatever figure the local standard may be, it would certainly appear no imposition on the consumer for the gas man to drive it out of the coal, and into the gasholder for delivery to the consumer's burner.

Mr. Lansden's paper on "Dip-Pipes," though *short* in itself, advocated *long* dip-pipes that shall reach well down into the liquor and tar, provision being made for removing the back pressure by lifting the sealing liquor through the agency of the exhauster. The ideas advanced met with no small degree of opposition in the discussion on the paper; but the "proof of the pudding is in the eating," and Mr. Lansden certainly does get good results.

It is quite evident that the interest in the generative gas furnace is not dying out, as was plainly shown from the lively dialogue that followed the reading of Mr. McMillin's paper on the subject of "Retort Furnaces."

The writer of this series of "After-Thoughts" has been permitted to visit the gas-works at Columbus, Ohio, and has had the good fortune to see Mr. McMillin's furnaces in active operation. They are now doing much greater work than was claimed for them in the paper presented to the Association. At the time set apart for the meeting of the convention the furnaces had been in operation but a few weeks. Now, instead of cleaning out the furnaces once every four days, they run them about three weeks before it is found necessary to remove the ashes and brittle clinker that accumulates in the furnaces, but does not adhere to the walls.

"DELTA."

Proposing the Formation of an Association of Gas Engineers in the State of Ohio.

The question of the policy of forming an association of gas engineers and superintendents for the district embraced within the limits of the State of Ohio has been under consideration for some time back. The prospect has been received with such favor on all sides that it seems to be now only a question of time, and short time at that, when the new organization will be perfected. In order to assist the gentlemen connected with the movement, in so far as giving publicity to the affair may be of assistance to them, we herewith reprint the circular call which is being mailed to the various gas companies of Ohio. We hope the gas interest of Ohio will prove thoroughly alive to the importance of the undertaking, and that all hands will join in bringing the movement to a succesful issue.

CIRCULAR CALL.

———, OHIO, Aug. 15, 1884.

To MR.———

Dear Sir:—After having given the question mature consideration, the undersigned are of the opinion that a State Association of Officers, Engineers and Superintendents of the gas companies of the State of Ohio will be benencial not only to the individuals named, but also to the companies they represent; we therefore jointly sign our names to a call for a convention to be held in the city of Columbus, Ohio, on Wednesday, September 17th next, at 9:30 A. M., with a view of perfecting such organization. We sincerely desire that you, and others of your company, will attend this meeting.

(Signed)

T. C. Jones, Prest. Delaware Gas Company.
C. M. Converse, Secy. " " "
J. Fullager, Eng. Cincinnati Gas Works.
Thos. Wood, Supt. and Sec. Sandusky Gas Company.
T. P. Wallace, Treas. Marion Gas Company.
Murray McMillin, Supt. Marietta Gas Works.
R. P. Green, Supt. O. P. Gas Works.
P. W. Huntington, Prest. Columbus Gas Company.
A. B. Robinson, Treas. " " "
Jas. McCanne, Supt. Portsmouth Gas Works.
E. D. Moore, Prestr Circleville Gas Company.
Jas. H. Smith, Prest. Newark " "
R. R. Dickey, Prest. Dayton " "
Jos. Light, Supt. Dayton Gas Works.
Jos. Bate, Secy. and Supt. Tiffin Gas Company.
H. J. Reinmund, Prest. Lancaster Gas Company.
F. A. Stacey, Supt. Chillicothe Gas Works.
W. H. Miller, Gas Engineer, Columbus.
J. A. Raynolds, Supt. Canton Gas Works.
Eugene Printz, Supt. Zanesville Gas Works.
Geo. H. Tayler, Supt. Warren Gas Works.
Jos. McLean, Sec. and Treas. Washington C. H. Gas Company.
E. B. Phillipp, Supt. Findlay Gas Works.
E. McMillin, Eng. and Supt. Columbus Gas Works.

[Official Report.—Continued from page 62.]

Seventh Annual Meeting of the Western Gas Association.

Held at the Southern Hotel, St. Louis, Mo., May 14, 15, and 16, 1884.

Second Day—Afternoon Session.

On the afternoon of the second day (May 15) the members were called to order at the hour named in the resolution (3 o'clock P.M.) when the midday recess was taken. Much gratification was expressed at the reappearance of President J. B. Howard in the Chair. Having thanked the members for their indulgence towards him, and expressing his indebtedness to Vice-President Lansden for the thoroughness and impartiality of that gentleman's rulings while acting as president *pro tem.*, the regular proceedings were opened in the following manner—

In regard to the visitors.

The President—Gentlemen of the Association: I desire herewith to make a statement which, no doubt, will be an exceedingly pleasant one for you all to listen to. Quite a delegation of "brother gasmen" from the Eastern section of our country have traveled a great distance in order to attend the meeting of this Association; and it has been a great source of enjoyment for us to have them here. Thus far, it appears to me, their reception has been somewhat in the nature of a formal one, and, I think, something more is due them. Viewed in that light, I will therefore, with your consent, appoint a committee on resolutions, and instruct that committee to prepare a set of resolutions which will express our feelings towards the gentlemen visitors who have honored us with their presence. Since I know that you are in hearty accord with me on this subject, I will not follow out the usual routine of asking that the Association vote upon the question, but will appoint the committee, and instruct them to report immediately. The gentlemen to comprise the committee are Messrs. James Somerville, of Indianapolis, Ind.; G. A. Hyde, of Cleveland, Ohio; and J. O. King, of Jacksonville, Ills. The committee will now retire and attend to the object for which they were appointed in as short a time as possible.

Mr. Scofield here remarked that he was about to offer a kindred resolution; but it had been his intention to perhaps cover a little more ground, inasmuch as he contemplated moving for the appointment of a committee on final resolutions, whose office it would be to take charge of the matter spoken of by the President, and also to make proper recognition of the many courtesies extended to the Association by the people of St. Louis.

The President thought that such action (referring to the latter portion of Mr. Scofield's remarks) could be taken when the time for final adjournment had been reached. He then called upon Mr. Gimper, of Leavenworth, Kansas, to read his paper entitled—

Is it economy for small gas works to adopt regenerative furnaces?

Mr. President and Gentlemen of the Association: You will all agree with me when I make the assertion that any real improvement, no matter how small at first sight that improvement may seem, is worthy of having a fair and impartial trial; the improvement once shown to be *real*, how great, and how speedy, is the progress of its adoption at the hands of former sceptics—all of which goes to show the completeness of the old adage that "nothing succeeds like success." More particularly will the speed of such development be proportioned in accordance with the nature of what the improvement may be, when the vital question that constantly confronts us for solution—the question of cheaper gas—can be shown to in any manner hinge upon it. This being so, you will still further agree with me that the fundamental principles for the successful and economical working of a gas plant, in great measure, are based upon a proper construction of its benches.

A year ago* I gave you a description of an improved furnace system that had been devised by us for the heating of our benches; and I will now endeavor, after 18 months of experience in its working, to enumerate the advantages of the new practice as against the former methods pursued. These advantages appear to me to be something like the following:

First. There is a decided saving in the amount of coke used as fuel—the coke from the bottom retorts being amply sufficient to maintain the heats.

Second. There is a great saving in the matter of labor. For the quantity of gas made during the five winter months the economy exerted in this particular amounted to one man per shift.

Third. There is an easily perceptible increase in yield of gas from a given quantity of coal. This increase has amounted to from one-quarter to one-half foot per pound.

Fourth. A longer space of life accrues to the retorts. After eighteen months constant working our retorts appear as if they were surely good for another similar period of time. In opposition to this, under our old plan of firing, from 18 to 21 months saw the usefulness of the carbonizing vessels ended.

* See Journal, Vol. XXXIX., No. I., p. 8, issue of July 2, 1883.

Fifth. Greater ease and facility in controlling the desired degrees of heat. This control is secured by simply adjusting the slides for the primary and secondary air supply.

Sixth. Greater bodily comfort to the stokers; and although this be the last virtue named, it strikes me as being far from the least.

Colonel Armington calls the old way of firing a barbarous mode. The force of this remark I have learned to comprehend fully. To make up a fire every hour, or hour and a quarter, is, as you all know, a very tiresome and exhausting labor; more especially is this so when you are operating with a coke that clinkers badly.

With the limited experience I had obtained one year ago, I reported to you that we attended to our furnaces once in six hours; and that the bars were drawn once every week. Since the time of that writing we have been enabled, through the teaching of greater familiarity, to do vastly better; the removals of ash are now only made once in 12 hours; and, during the hot weather of last summer, the operation was performed only once in 24 hours. The bars have not been drawn since last July.

This lightening of the labors of your stokers will certainly be appreciated by them, and must result in rendering them more careful and efficient in many other directions. A natural concomitant of all this is that the cares of the superintendent and engineer are materially lessened.

There can be no doubt that, with these advantages, the cost of production will be materially reduced; and, this being the case, is it saying too much that it is a mistake, at this day, to build a new, or even rebuild an old, bench upon the old-fashioned plan?

Discussion.

President Howard hoped that the members would ask a good many questions regarding the paper just read. He said the topic was a more than ordinarily interesting one. The discussion was then proceeded with in about the following manner.

Mr. Highlands—I would like to ask Mr. Gimper—since he claims to have made a gain in production of from one-quarter to one-half a foot per pound of coal carbonized, through the use of this improved system of heating—what size of retorts he employs; the average yield obtained; the quality of coal worked; and, also, the candle power of the gas.

Mr. Gimper—The retorts are 15″ × 28″ × 9′; the yield, prior to the introduction of the furnace system spoken of, was, on an average, about 4.37; this average has since been increased, in one month, to as high a figure as 4.93, and, for the first four months of this year, the average has been 4.86. I will give you the average figures for the last six months of 1883:—July, 4.87; August, 4.93; September, 4.46; October, 4.43; November, 4.50; December, 4.46. In the summer we obtain a better yield from the coal worked than that obtained in winter. The coal is a native coal, mined in the State of Kansas, and is known to the trade as "Cherokee" coal. It is far from being even in grade; indeed it varies considerably. The illuminating power of the gas will average 15 candles.

Mr. McMillin—I did not hear you describe the furnace at the Cincinnati meeting. Would you give me some idea as to how it is constructed?

Mr. Gimper—It is a small, straight, deep furnace, and is contracted on top as all generative furnaces are. The secondary air supply passes back about a foot and a half below the floor line of the retort house, going behind the upright bench flue; then we pass cold air, upwards and down again, at the back of that flue, then to the front and on to the retorts, where it meets the secondary combustion. Steam is used under the grate bars.

Mr. McMillin—What is the depth of coke in the furnace?

Mr. Gimper—From 4 to 5 feet.

Mr. McMillin—Your furnace is really regenerative?

Mr. Gimper—Yes.

Mr. Highlands—What is the yield per bench?

Mr. Gimper—I have made 52,000 feet with one bench of sixes.

Mr. Highlands—52,000 feet in 24 hours?

Mr. Gimper—Yes. There is one other advantage in the use of this furnace which I did not mention in my paper. Many of you, of course, are already working under four-hour charges; but some of my neighbors, carbonizing the same coal used by me, in order to get all the gas out, are obliged to run six-hour charges. I run off a charge in 4½ hours, and could, I think, do it in three hours.

Mr. Watts—Have you ascertained what amount of coke is used in keeping up the heats?

Mr. Gimper—One-third of the quantity produced—just that drawn from the two lower retorts.

Mr. Scofield—Do you charge two retorts at a time?

Mr. Gimper—Yes, sir.

Mr. King—How many men do you have on watch—one man to a bench?

Mr. Gimper—Oh! no; one man could hardly be expected to handle the coal and coke. Last winter, when I was enabled to run two benches to their full capacity—or nearly so—I could make 20,000 feet per man quite

easily. With the inferior quality of coal carbonized, as compared with Youghiogheny, we are obliged to handle a greater quantity of it than you who carbonize the latter. We also get an inferior coke. Perhaps, indeed certainly, we would use less coke in the firing if it were as good as that resulting from the carbonization of Youghiogheny, or other first-class coals. Still, in the item alone of labor saved we regard the furnaces as worth all they cost. Then the question of heat is so easy to settle. Say we want to charge 1,400 pounds to a bench to-day, and 1,800 pounds to-morrow—all we have to do is to change our slides to suit the conditions.

Mr. Smith—Whose furnace do you use—one of your own devising?

Mr. Gimper—One from ideas picked up here and there—one obtained in this place and the other somewhere else.

The President—You spoke about the duration of your retorts. Is there anything to complain of on that score?

Mr. Gimper—I have had no reason for such complaint as yet. The reverse order is about the state of the case. I have run under the new conditions for only 18 months; and had hoped that the furnace would be cold enough (it was let down on the 28th of April) to permit a critical inspection, in order to determine this very thing, before I came on to the meeting. This, however, I could not do.

Mr. Smith—You only use one bench of sixes now?

Mr. Gimper—That is all.

Prof. Douglas—How do you find the heats to be distributed in the bench—equal, or fairly equal? Are the lower retorts heated as well as the top ones?

Mr. Gimper—No, sir; the top ones are the hottest.

Prof. Douglas—You charge them heavier?

Mr. Gimper—Yes.

Mr. Moran—I would like to ask Mr. Gimper what sort of a bench setting he has in use.

Mr. Gimper—No particular setting—one built for us by Parker, Russell & Company.

Mr. Moran—A bridge wall?

Mr. Gimper—No, sir; no bridge wall. I close all the space between the top of the bottom retort and the bottom of the middle retort. I let no heat from the furnace pass from the furnace between these two retorts, and I do not let any heat pass between the top of the middle retort and the bottom of the top retort except at the back portion—so the center is a combustion chamber by itself; and not until the gases have all been commingled, and proper combustion takes place, can they pass over the top retorts and down the outside.

Mr. Shreve—I understood Mr. Gimper to say that one man could not attend to the running of a bench of sixes; this has set me to thinking that I am probably working my men too hard. I am running a bench of fours and also a bench of threes, and one man does all the work. Now, why should a bench of sixes be harder to work than a bench of fours and threes?

Mr. Gimper—It may be explained by saying that you have better workmen in Iowa than we have got in Kansas.

Mr. Shreve—Perhaps so; at any rate, I have run all winter that way.

Messrs. Scofield, Judge, Shreve, Moran, and Starr continued, at some length, to discuss whether it was right to ask one man to do all the work in connection with a bench of sixes. The discussion was carried on in a jocose spirit, and the best of good humor characterized the dialogue.

The President then announced that the committee on resolutions, in respect to the Eastern visitors, was ready to report.

Mr. Somerville, from that committee, then submitted the following:

Mr. President: The committee whom you appointed to prepare certain resolutions, regarding our visiting brethren, beg leave to respectfully report that we consider the presence of our friends from the East, to this meeting of the Western Gas Association, as a great honor to us. We esteem it a high privilege to receive them, and think very highly of the kindly spirit which induced them to come so far to visit us. We take this way and opportunity to spread on the record our sense of the honor done to us.

JAS. SOMERVILLE,
J. O. KING,
G. A. HYDE,
} Committee.

The President—Gentlemen, you have heard the resolutions as read; what is your pleasure in regard thereto?

Mr. King—I move their adoption by a rising vote.

Mr. King's motion prevailed unanimously.

The President—I notice the presence of our Eastern brethren in the room. I am told that some of them are very fluent speakers; and it certainly will be very pleasing to listen to any remarks that they may make. I presume they will respond if you only call upon them.

A chorus of voices repeated the name of Harbison; overcoming his true American modesty, that gentleman came forward and spoke as follows

Mr. President and Gentlemen of the Western Gas Association—I very much regret, in response to the cordial invitation of your Secretary to the gas men in the East to come on to St. Louis to this convention, that so few were enabled to give an affirmative answer by showing themselves before you and receiving your kindly and fraternal greetings—to look into your warm, earnest, honest faces and receive the friendly grip, which every gas man can and does extend unto another, no matter in what part of the world the meeting takes place. (Applause.)

Mr. President, in your resolutions you kindly alluded to the Eastern men, and also to the honor they had bestowed upon their Western brethren in thus attending the Seventh Annual Meeting of the Western Gas Association. Well, sir; permit me to say, in reply to that, the position of affairs must be changed. Mr. President, it is we who are the honored ones in being thus permitted to be present; and we so feel it. I have long desired to make this journey in order that I might make the personal acquaintance of the gentlemen whom it has now been my pleasure and fortune to meet, and with whose names I have long been familiarized through perusing the columns of the AMERICAN GAS LIGHT JOURNAL. I have wanted to meet them face to face; I have wished to come and sit at their feet, so that I might learn from them, and in both of these objects have I been successful during the past two days.

Mr. President, these Associations of gas men—beginning with our own dear New England one (which is the parent Association), the American, the Central New York and the Western—have done a great amount of good to those who are engaged in the pursuit of advancing our science; not alone in the formal presentation of papers, and the discussions thereon, but in the quiet social chat that takes up the time between the sessions. I feel you will all join me in the wish and hope that these various gatherings will flourish and prosper in acccordance with the ideas of the master spirits who conceived the notion of their birth.

As I look at it, the business of the manufacture and distribution of gas is one of the most honorable professions of the present day. The position taken by some of us in the East, is that consumers have some rights which the managers of gas works are bound to respect. (Laughter and applause.) I do not say—I do not set up the claim—that the managers of gas works have any rights that the public ought to respect; although I believe that such rights exist. (Laughter.) It would take a long time to enumerate the benefits which have accrued to our profession as a result of the formation of these Associations. Let me briefly state a few of the most pronounced. It is within the recollection of us all that a few years ago—and but a few—you could scarcely find a place where the selling price of gas was below $3 a thousand—indeed it was not a troublesome task to find situations where the rate was double that. On the other hand, it is rather difficult now to discover localities where the $3 figure prevails; and it seems to me, in seeking out a reason for this wonderful change, that our Associations, with the members meeting together at stated periods, comparing notes, receiving advice, and mutually imparting information, are largely responsible for these forward steps. Many of the improvements in system of manufacture, instituted in our various plants, have resulted from our pleasant and harmonious mutual intercourse. The same rule applies to the distribution service; and this remark leads me on to another phase of the question.

I remember very well, some 25 years ago, when I was a clerk in the office of the company that to this day I have the honor of serving, I found in existence a system of bookkeeping which hardly accorded with my ideas as to how a method of accounts should be properly kept. I requested and received from my honored President a general letter of introduction; and armed with this document, I gained admittance and a cordial welcome into the counting-rooms of the gas works that I desired to inspect. Their entire systems of keeping accounts were laid before me, and this cordiality opened my eyes as to what gas men really were. My feelings in regard to their nature underwent a great change in this particular; for, years before that, when I was a very young lad in the employ of a firm of Hartford booksellers, I remember being instructed to go to the gas company's office and settle a bill that had been rendered against my then employers for a month's consumption of gas. I approached the cashier's desk in fear and trembling, possessed with a holy horror of the man that was taking the money. People held the gas man in dread in those days. That is not the order of things now; I do not know of anyone who, on general principles, seems to be afraid of the gas man—certainly not when it comes to a question of paying bills. The consumer does not approach the cashier with humility, nor with any appearance of dread; indeed, they all have sufficient courage to "speak right out in meeting"—and, for a fact, they oftentimes make complaints about the size of their bills. (Laughter.) I have even heard it stated that consumers have had the temerity to complain about the candle power of the gas. A good many of them imagine (the newspapers pretty much all appear to agree on this) that gas engineers have little else to do besides eating rock candy, and drinking champagne, and all that sort of thing. (Laughter.) I am heartily sorry to be obliged to say that they are wrong. (Renewed laughter and applause.)

And now, Mr. President, in conclusion, let me again reaffirm my regret that some greater number of our Eastern brothers are not here to-day to fittingly respond to the earnest sympathy and appreciation contained in the words of the resolutions submitted by your committee; but, sir, on behalf of those present and absent I wish to extend to you my hearty thanks for your invitation, and for your cordial greetings. Let me express the earnest hope that when the time for our annual Eastern meetings arrives we shall have the honor and pleasure of receiving you (any one or all) at our sessions; and of one thing, gentlemen, rest assured—we will endeavor not to be behindhand in extending pleasant and convincing testimony as to the heartiness of our hospitality; the latch-string will always be out to the Western gas men. (Applause.)

The President—Gentlemen, there are some others of the visitors present with us from whom we should be glad to hear.

In response to calls, Mr. Thomas, of New York, spoke as follows:

Mr. President, the ground has been so fully covered by my friend Harbison as to make it seem almost a pity to say anything further, for fear of spoiling the effect that his speech has exerted upon his auditors. This is the first time I have had the pleasure of coming out here to meet you, and the visit has certainly been a source of great satisfaction to me. I had some idea of what Western people were before I came here, but I certainly think, judging from the progress of developments at this meeting, that I rather gauged them a little too low, underestimated their product to the pound, and hardly did justice to their candle power. (Laughter.) Not that I had any of these items at low figures either. I rather think the visitors who came along with me are just about as much at fault. Brother Harbison says he has actually heard of some consumers who found fault with their gas bills. In my long experience I have also heard of two or three like cases. I wonder if Harbison has read about the new definition of the word "anomaly." For fear he did not, I will venture to give it. A young hopeful asked his father what "anomaly" meant. Paterfamilias replied, "Why, my son, an anomaly is a man who pays his gas bills without calling everybody connected with the gas company a thief." Times have changed, and decidedly for the better, in the business of gas manufacture. The old-time secrecy has been replaced by a desire to mutually help one another.

Now, as I said before, brother Harbison has gone over the ground pretty thoroughly; yet I would like to make some allusion to one remark that was offered by President Howard—and that remark came in when he said he thought the reception accorded the visitors was rather a cold one. While not exactly desirous of speaking for the Eastern party as a whole on this question, I cannot forego saying something, as an individual, in regard thereto. The idea put forward as to the coldness of the reception given us recalls to my mind a story told about a man who lived in a place not far rom where our friend Harbison is located. The man of whom the story is related was a decided unbeliever in a future state—that is, he was an unbeliever while he remained active in the flesh. In due course of time the sceptic "paid the debt he owed to nature," and "went the way of all flesh." When about a year had elapsed after his death, his son was asked if anything had been heard from him. The son replied, "Oh, yes; we got a telegram from him." "Well, what did he say?" was the next query. The answer was, "Why, I believe he said, 'send on my summer clothes.'" (Laughter.) The fact is, I have been so warmly received here that I have thought of sending half a dozen telegrams to New York for my summer clothes. (Great laughter and applause.)

The President—Gentlemen, I perceive another modest Eastern brother, seated away off in the background, in the person of Mr. John Andrew, of Chelsea, Mass. I will call upon him as a member of the New England Association of Gas Engineers.

Mr. Andrew—Mr. President, and Members of the Western Gas Association: I have never made a speech in my life, probably because I did not know how. Certain it is, I fear that my eloquence will fail me now. I can say, however, that I thank you for the kindness, courtesy, and friendship extended to my friends and myself; and I hope and trust that we will have an opportunity to meet you during some session of our Eastern Association, when we will endeavor to reciprocate the many and generous favors so heartily bestowed upon us while we have been in this city. (Applause.)

The President—Mr. Slater, of Providence, R. I., is also with us. We should like to hear from him.

Mr. Slater—Mr. President, like Mr. Andrew I must confess my inability to make a speech, and will therefore refrain from making such an attempt. Since entering this hall (having made my appearance while friend Harbison was speaking) it appeared to me that I was in attendance at a session of an Eastern Association, since none but Eastern men appeared "to have the floor." I feel it to be unnecessary to make any extended formal remarks regarding the matters so well commented upon by my fellow visitors. I can only say that I have taken great interest in the sessions of this meeting, and may further add that the Western Association is doing great things in the way of advancing our common profession. Gentlemen, I heartily thank you for your kindness.

The President—The next thing in order will be the reading of a paper presented by Mr. T. G. Lansden, of St. Louis, Mo.

Mr. Lansden—I promise that this paper will be a very short one. It is in continuation of a similar one* read by me before the Association at the 1883 meeting in Cincinnati, Ohio, on the subject of

BENCHES OF "THREES."

I have been in receipt of letters from several parties desirous of knowing what success I have met with in working the large-sized retorts which I installed in the works under my charge during the last year. These inquiries, it appears to me, will be best answered by presenting a short statement as to what I have accomplished, since the last meeting of the Association, with them.

At our meeting last May (1883) I gave an enumeration of my reasons for still adhering to benches of threes. In that paper I also gave the results of one month's running of a new stack in which I had placed larger retorts, the construction of the bench differing only in that the carbonizing vessels were of increased capacity. After one year's experience with these large retorts I am enabled to append the following results.

Those who may feel sufficient interest in the matter can the more readily understand what I may now say if they will refer to my former paper on the subject, published in its proper order in the proceedings of our last annual meeting, as reported in the AMERICAN GAS LIGHT JOURNAL.

One year ago last spring I rebuilt a stack containing 26 benches of threes—each retort measuring 3,000 inches of floor surface. Last spring (1883) I rebuilt another, containing 24 benches of same sized retorts. This latter stack I had running one month before my annual report was made up for presentation to the officers of the company—the date of same being December 1. The figures I gave you in my paper of last May (1883) were up to the 1st of December, 1882; these I now give you are up to the 1st of December, 1883. I had the benefit of the first stack of benches for one year, as also one month's run of the stack of 24 benches. This would be (for the twelvemonth) equal to one year's run of 28 benches of the large-sized retorts.

I had an increase in the annual make of gas of 42,500,000 cubic feet, and a decrease in my gas making account of $1,350. This result is gained from being able to charge 150 pounds more of coal at a time than formerly.

Having had such great improvement, I determined upon going a step further in the same direction; and am now placing, as my top retort, a vessel containing 3,450 inches of floor space—the dimensions being $19'' \times 32'' \times 9'$. On this last bench I am now carbonizing 1,200 pounds of coal every four hours, or 7,200 pounds in the 24 hours.

The report I gave the Association for the year ending December, 1882, was: Gas made, 420,000,000 cubic feet; average number of retorts, 137; yield, 5.12 cubic feet; candle power, 16.92. For the year ending December 31, 1883, the figures are: Gas made, 462,729,000 cubic feet; average number of retorts in operation, 132; yield, 5.18; candle power, 17.79; amount of coke used under benches, 42 per cent. of that made.

From the bench with which I am working off 1,200 pounds at a charge, I measured the coke left after firing, and found that the portion consumed was a trifle less than 40 per cent. of the coke made. I measured the coke product of 48 hours working.

This, gentlemen, I promise you shall be my last infliction upon the Association in regard to the subject of benches of threes.

Discussion.

Mr. McMillin—What is your usual charge to a bench?

Mr. Lansden—My ordinary charge to a bench of threes, retorts $18'' \times 28''$, is 1,000 pounds. The report given for the year includes 28 benches of that size of retorts, the average number of retorts worked being 132. Something over a month ago I started the experiment of placing the $19'' \times 32'' \times 9'$ retort on top of the two lower ones; on that bench I have been for some time working off 1,200 pounds to a charge. Now, just as fast as my old benches burn out I am putting in a top retort of the dimensions last stated.

Mr. McMillin—Of course, you think you are getting just as good a yield, or you would not follow this system.

Mr. Lansden—We make over 30,000 cubic feet to a man on the bench.

Mr. Smith—Does your $18'' \times 28''$ last as long as when $15' \times 23'$?

Mr. Lansden—I figure on the amount of gas I make. I do not care how long they last while they produce what I think they should. From 18 to 24 months is as long as I expect to run my retorts.

A Member—Do you use cannel coal?

Mr. Lansden—Yes; a mixture of Indiana cannel.

Mr. Starr—I would like to ask, if you had to build an entire new set of benches, whether you would build for threes or sixes.

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*See JOURNAL, Vol. XXXVIII., No. 11, issue of June 2, 1883.

Mr. Lansden—I hardly think it necessary to answer that question.

Mr. Starr—Well, let me ask the question in this way: If I were building new works, would you advise me to build for threes or sixes?

Mr. Lansden—I might not advise you to build for threes; but I would build for them. The point with me is this: I have been striving for 22 years to get a twelvemonth's report of what other works have done in running sixes, but I cannot obtain it. If I were cramped for ground room I would put the retorts on top of one another; but where ground room was ample I would erect threes, even if every dollar spent in the construction was to come out of my own pocket.

Mr. Thomas—How wide are your ovens?

Mr. Lansden—Seven feet in width.

Mr. McMillin—What is the yield of the Indiana cannel?

Mr. Lansden—I have not been able to separate it. For a great many years we used West Virginia and Kanawha cannels as enrichers. The Indiana cannel keeps up the candle power nearly as well as these did, and the cost is much less. To bring up my candle power I generally use from 5½ to 6 per cent. in the summer season, increasing the percentage to perhaps 12 per cent. in winter. The only drawback to the Indiana cannel is the poor quality of its coke. I could use the Virginia cannel coke under my benches in the summer season, but I cannot do so with the other. I have to sell it very cheap.

(To be Concluded.)

The Application of Gas for Heating Bakers' Ovens.

By W. J. Booer, of London.

[The following paper on the above-named subject was read by the author at the last meeting of the British Gas Institute. The text is taken from the report of the proceedings of the Institute as published in the *Journal of Gas Lighting*.]

The text of this paper has been suggested by the circular and list of subjects issued by the Council of the Institute, dated March, 1884—"The Best Means of Extending the Use of Gas, and How its Consumption may be Increased." The vast importance of the subject I need not dwell upon; but it may be well to remark here that the many improvements introduced into the manufacture of gas tend (or should do so) to the production of a larger quantity of gas from each ton of coal, and by improvements in plant to produce still more gas per day from the same retort bench. Then the progress made from time to time in regard to gas burners allows of a greater amount of illumination being obtained with a smaller consumption of gas. The more these various improvements are introduced, the more it becomes the duty of gas manufacturers to look for new applications for their product. In this paper I purpose pointing out one of the best ways of extending the use of gas, and giving some indication to what extent its consumption may be increased.

"Coal gas as fuel," "The fuel of the future," "Heating by gas," are all very familiar phrases to the gas engineer, and terms which are now getting old; and when we are told by Mr. G. Livesey that he has found, from careful observation, that 72 per cent. of all the gas sent out is consumed between the hours of 6 and 12 P.M., and that during the remaining 18 hours only 28 per cent. is employed (a great portion of which must be used for lighting purposes in dark workshops and warehouses), what a little appears to have been done in the way of making gas a fuel. The Smoke Abatement Exhibition of 1882 initiated several movements to bring gas into more general use as a fuel; and, amongst the number, the particular subject of this paper—the "Gas-heated Bakers' Oven." The principle there adopted—viz., external heating—was, however, found to be too costly; and, further, it was not new ovens which the baker required, but the existing ovens heated with gas. I will quote here the words of Mr. W. B. Pringle, President of the London Bakers's Association. When talking with me on this subject, and referring to the external application of gas, he said, "Mr. Booer, you are on the wrong track. What you want to do is to put gas into the present ovens in place of the coal fire." This started a new idea, and from that day the work of devising a new plan of heating existing bakers' ovens with gas was begun. The first record of these attempts was fully published in the *Journal of Gas Lighting* for Nov. 13, 1883 (p. 845).

I shall now point out some of the difficulties in the way of applying gas to bakers' ovens, and then show and describe how these difficulties are met by my latest arrangement. I will next give some trade opinions as to the working of the arrangement, and indicate the impediments to its general adoption; suggesting how gas engineers and managers may assist the increased consumption of gas, with profit to gas companies and benefit to the community at large.

Allow me here to remark that, in giving what may appear to be the details of a business with which you (as gas engineers) may think you have little to do, I do so for more reasons than one. In the first place, when you return to your various duties, the desire to push this question may bring you in contact with many persons in the trade for which this application of gas is designed; and you will then be the better qualified to answer many questions that may be put, if I supply you with the facts obtained by personal attendance for many nights in the bakehouse. Further, I should like to enunciate the principle that, in any attempt to apply gas for heating purposes, there must first of all be acquired a thorough and (as far as possible) a complete knowledge of the particular trade or purpose—with its many technical and other difficulties—before any amount of success can be obtained. And I may, perhaps, here be excused for saying that it was my thorough knowledge of the stained-glass business which enabled me to bring to perfection the gas kilns I devised for use in that business.

The work of an ordinary bread bakery in London commences about 8 P.M. by setting what is termed the "sponge." The sponge works itself into a condition ready for the next process in from two to three hours; and then the dough is made by mixing the sponge with more flour and water. The dough will then work itself ready for the next process in about two or three more hours. You will here notice one of the first difficulties of the baking trade—viz., the uncertainty as to time of the various processes through which the dough passes; all affected by the quality and quantity of the yeast, the temperature of the water used in mixing, and the general temperature of the atmosphere and (more particularly) of the bakehouse. When the dough is made, it is usual for the men to lie down in the bakehouse and wait for its "rising." In some bakehouses a very ingenious arrangement is resorted to for the purpose of knowing when the dough is ready. Under the lid of the trough containing the dough a knife is put, with a weight of about 2 pounds on the end of it, and a piece of iron underneath; so that, when the dough raises the lid of the trough, the weight falls upon the piece of iron plate and wakes the men. At this point it is usual to start the oven or ovens (I am here referring to the ordinary coal oven—of which it is estimated that there are more than 6,000 in London, and 60,000 in England—and for which the gas-heating arrangement now under consideration is specially designed).

As bakers vary so much in their statements as to the time and quantity of coal used for heating their oven, I will now give you a record from personal observation of the heating of a coal oven for a first batch:—July 17, 1883. Coal oven fire lighted at 12:30 (midnight); burning until 2 A.M.; lying down for two hours (which means that the damper was put in to allow the heat to develop in the oven); at 4 A.M. fire again made up; and about half an hour before "setting in," oven again laid down. In all, ten large shovelfuls of coal were used for the first heating of the oven. When the weight previously mentioned falls, and the men resume work, they throw out the dough from the trough and cut it up into pieces, weighing each piece. This operation is called "scaling off." As each piece is weighed, it is moulded or rolled into a round form, and laid on one side. When all the dough is scaled off, the work of moulding for the oven commences; and the coal oven is then "scuffled out." This is done by using a large mop (with water) to remove the soot from the floor of the oven, and also the cinders which have found their way in from the furnace. The importance of the oven being at a proper heat for the dough will now be easily seen. Many hours have been spent in bringing the dough up to this point, at which, as a rule, it cannot be allowed to wait. It must go into the oven or spoil; and the effect of a "slack" oven or a "rash" oven—that is to say, an oven over or under heated—may be noticed in the various bakers' windows as you pass along the streets of London. A slack oven turns the bread out pale, or, as the trade term it, "boiled;" while the rash oven turns it out "toasted"—black bottoms and highly colored, but not thoroughly soaked. Each fresh consignment of coal, the varying draught in the flue, and the stoking of the furnace are, therefore, great sources of trouble to the baker, who, having spent all night in the preparation of his dough, cannot possibly replace it in the morning if his oven fails him. Therefore you will see one reason why the baker should hesitate to apply any new arrangement to his oven.

I will here quote a paragraph from the last annual report of the London Master Bakers' Protection Society, to show their feeling on this point:

"The baking trade has so often been made the sport of scientific pretenders, who profess to do that which to them proved an impossibility, that we must at once concede that Mr. Booer has a most difficult task to perform. He has to conquer the prejudices of men who have been so frequently deceived that they shrug their shoulders and smile dubiously at his efforts. To ask such to allow their furnaces to be experimented upon only brings forth a courteous refusal in response; and the scientist, who feels he has the solution within his grasp, is almost debarred the opportunity of giving it a practical demonstration."

I shall have occasion further on to refer to other parts of their report. To meet this particular difficulty of a required heat at a particular time, various ovens have been invented, called "continuous ovens" (such as hot-water and coke ovens), which are to be always hot; but the ordinary coal oven cannot be converted into this form. It is necessary, therefore, that, in applying gas to existing ovens, it should be so arranged that whatever can be done with the coal can be done with the gas—and a little more. Suffi-

cient fuel must be at hand to heat the oven more quickly than coal could do it, and with such uniformity that an hour's heating on one night gives the same result as an hour's heating on the previous night. The arrangement must also be of such a nature that it can be applied to the oven without interfering with the daily business of the baker, as it is a rule for the trade not to have any more ovens than they have work for. To suggest, therefore, that a baker must do without his oven for one night would be fatal to any improvement. The cost also—a most important matter—must not be very great, as by far the larger proportion of London bakers are without much spare capital.

As to how far this invention meets the requirements of the baker, the trade and its reports shall now testify. On July 13, 1883, a deputation of master bakers, appointed by the Trade Protection Society, attended to see two batches of bread baked in an oven heated by this arrangement; and, as the outcome of their visit, the report presented at the end of the year (and to which I have already referred), contained the following:

"Without hazarding the assertion that Mr. Booer has wholly met the three requirements of the baker—namely, 'suitability,' 'durability,' and 'economy'—in justice to that gentleman it is only fair to state that he has, beyond all question, succeeded in turning out, by the gas process, a loaf equal in every respect to the best loaf baked by the ordinary oven. The practical question is, therefore, set at rest. The second condition has yet to be tested; but we have Mr. Booer's authority for stating that, when once the gas oven is in work, very little outlay will be required for repairs. As to the cost of fuel, this will be rather a question for the gas companies and senatorial legislation than either for the bakers or Mr. Booer. For some months past Mr. Booer, under the cognizance of this Committee, has been perfecting his invention; and more than one member of the Society has expressed himself favorably as to the results obtained."

To form a proper estimate of the value of this report, it may be well to mention that, after it is written, a Committee of the Society carefully consider it; and then, if approved, it is ordered to be printed and circulated throughout the trade.

Particulars of the Test Bakings in Mr. Loeber's Oven, to which the Invention has been Applied.

The oven is 7 feet by 6 feet, internal measure; or what is generally known as a 6-bushel oven. On July 13 the deputation from the Master Bakers' Association—consisting of Mr. Pringle, Mr. May, Mr. Fox, and Mr. Inglis—attended at Mr. Loeber's, 161 Blackfriars Road, London, to see to batches baked, as follows:

Commenced heating the oven	12.15 A M.
Finished	2.25 "
Gas consumed, 460 feet.	
Commenced setting in	2.35 "
Oven closed	2.53 "
Oven opened and "cottages" drawn	3.53 "
Remainder of first batch drawn	4.30 "
Second heating commenced	4.40 "
Second heating finished	5.55 "
Gas consumed, 275 feet.	
Commenced setting in	5.55 "
Finished and oven closed	6.11 "
Opened and "cottages" drawn	7.30 "
Remainder of second batch drawn	7.55 "

Since these trial bakings a number of improvements have been made; reducing the time of heating and the quantity of gas consumed. A 10-bushel oven is now heated in less time, and with less gas, than the 6-bushel oven referred to.

The *Bakers' Record* for Dec. 29, 1883, in its editorial article, gave the following unbiassed testimony:

"Mr. Booer had three important considerations to weigh in the application of his invention. In the first place, he must adapt his apparatus to furnaces already existing; secondly, he must turn out a loaf equal in every respect to that baked in the ordinary manner; and, thirdly, the cost must not be in excess of the old plan. So far as the first two conditions are concerned, we aver *most emphatically* that Mr. Booer has fully succeeded."

Now as to the design of the invention, and its probable effect upon gas companies. The arrangement is simple, and easily adjusted to the furnaces of the existing ovens. The design is to produce the largest possible sheet of flame from a limited source, and ensure an equal distribution over the oven. [Mr. Booer here showed the burner, and explained how the heat is conveyed to all parts of the oven. He also described how it is fixed in the oven.]

As to the consumption of gas, every oven to which this burner is applied will, on an average, consume not less than 1,000 cubic feet per day; and this gas will be required between twelve o'clock at night and twelve o'clock at noon—or at a time when the gas companies have now little or no demand for gas. Once fixed, it will be a certain daily consumption. The people must have their daily bread; and, therefore, the baker must have his daily gas. In the report of the South Metropolitan Gas Company for the half year ending June 30, 1883, it was stated that 1,500 cooking stoves brought in £5,700 (being equal to £3 16s. per stove); and that the average income from gas engines was equal to £15 15s. per engine per annum. Now, one baker's oven will bring in a certain revenue of at least £51 per annum, calculating the price of the gas at 2s. 10d. per 1,000 cu. ft. Thus 100 of these ovens in a company's district would bring in £5,100; or nearly as much as the 1,500 cooking stoves. As we know that there are, in and around London, more than 6,000 of these ovens to which gas may be applied, it means to the London gas companies an income of about £900 per day, or equal to £328,500 per annum.

It does not need any force of argument to show how very desirable it is that the gas companies should forward this enterprise; and I must here acknowledge more especially the cordial assistance given to me by the South Metropolitan Gas Company and the Gas Light and Coke Company (who have encouraged and helped me in many ways to combat the difficulties), as well as the valuable help of my coadjutor, Mr. R. A. Gilson, whose advice and assistance in many of my experiments has been of great value, and whose name is coupled with mine in this patent. Without their aid the gas oven would not have reached its present position of success. But there is still a battle to fight; for vested interests have been touched, and the oven builder, the coal merchant, and even the baker, are all inclined to oppose the general adoption of the gas oven. The oven builder says it will take away his living, for there will be no repairs; the coal merchant does not like the idea of losing so good a customer; and the baker says he is very conservative, by which he means to convey the idea that he is quite satisfied with his filthy coal furnace, because it will cost him something to have the gas furnace put in. But the smoke abatement act, public taste, and a growing sanitary revolution, will have something to say on this question; and it now becomes the duty, as well as the privilege, of every gas manufacturer to make good use of all the law and sentiment at his command, to forward so satisfactory an end as the use of gas in bakers' ovens. The large consumption, the increased agitation for sanitary improvement in bakehouses, the smoke nuisance, and the proved superiority of gas for the purpose, should be strong weapons in the hands of the gas engineer; and with the co-operation of such a company as the present, immediate and important improvements may soon be realized in the sale of gas and the sanitary condition of our bakehouses. The *Bakers' Record* of April 26 last, under the head of "Revival of the Old Persecution," complains of the police activity amongst the bakers to suppress the smoke nuisance, and says:

"Just now the spirit of the late Mr. Sandison is making, as our religious friends would say, 'a new manifestion;' and throughout the whole metropolitan radius we are informed bakers' chimneys are emitting more smoke every night than would suffice to eclipse all the dense clouds that ever issued from Pluto's burning regions. Like the unteachable Turk, the baker is not to be turned from his evil ways. Notwithstanding Mr. Sandison undertook to teach the operative how to stoke his furnace, he has profited not. And Mr. Coles—Mr. Sandison's successor—has been no more fortunate with the oven builders; for, with all the new patents and improvements, they have not yet succeeded in providing a furnace that will consume its own smoke. The result of this wilful perversity, or deplorable ignorance, is that the master bakers are going through a second edition of that persecution which a few years ago roused so much indignation in the trade."

In conclusion, I have much pleasure in saying that a full-sized oven, with the gas arrangement fixed in it, may be seen in daily operation at the International Health Exhibition; and you are one and all cordially invited to view the oven, and see the bread baked in it. Mr. Marshall, the baker who is working the oven, has four fitted up; and they have been in use daily for months in his various bakehouses. He has now found, after months' experience, that the average consumption of gas per oven is 1,250 cubic feet per night. With this quantity of gas he turns out an average of five batches, costing him, with gas at 3s. per 1,000 cubic feet, 9½d. per batch. He also finds that he saves in the weight of the bread more than sufficient to pay for the entire amount of gas consumed. This saving is effected by a better diffusion of the heat, and a retention of steam in the bread; giving a thinner crust and a larger loaf. This is without making any allowance whatever for saving in repairs, shovels, rakes, and the necessary attendants of a coal-heated oven, with a perfect freedom from smoke, dust, and ashes. The obnoxious gases generated from the storage of coals are also entirely removed, which, as a chemical fact, is one of the greatest importance. An opportunity now presents itself, therefore, for gas engineers to come to the relief of the bakers, and see them supplied with a gas furnace which will at once free them from the persecution they so much dread, render their ovens clean and healthy, and their work easier, besides giving to the public a better and more wholesome loaf of bread.

Discussion.

Mr. G. Livesey said he should like to be allowed to say a word on Mr. Booer's behalf. Mr. Booer had worked most earnestly and perseveringly upon this matter; but, so far, had not, he (Mr. Livesey) believed, derived any benefit from what he had done. Many men would have been disheartened and discouraged by such obstacles as had lain in Mr. Booer's path. A great difficulty which seemed to exist in the way of introducing Mr. Booer's apparatus into bakers' ovens was a very natural fear on the part of the baker that, if they were to admit that it was successful, they would be compelled to alter all their ovens, and thus put themselves to considerable expense. Gas engineers could sympathize with such a fear, for they knew what it was to alter appliances of any kind; and it behooved them, if they wished to increase their consumption, to do what they could both for the baker and for the inventor of the apparatus. He (Mr. Livesey) believed that the origin of the present invention was an application of the principle to an oven for vitrifying painted glass. He first saw it on the premises of Mr. R. A. Gilson, in Union street, Borough, and found that it answered admirably there. Since that time Mr. Booer had applied his energies to the baking of bread. He believed that it could be shown that the oven was a success; and he had no doubt that, if it was so proved, the smoke abatement act would be brought to bear, in order to facilitate and hasten the general adoption of gas in ovens. Anything that gas engineers might be able to do in order to help forward so good a movement was well deserving of being done. One way in which the baker asked to be helped was to be supplied with gas at cost price; at least, at a very much lower rate than that used for lighting. But it was not likely that the baker could be helped in such a manner. He knew that some of their friends had ventured to supply gas for manufacturing purposes at a lower rate than for lighting; but the gas companies in London had not seen their way to do so. They had been firm and decided in saying, "We cannot reduce the price. If the oven cannot be made a financial success with gas at the ordinary selling price, we cannot help you in that direction at all." As to gas pressure, Mr. Booer had successfully contended against this difficulty; and, while the period after midnight was, of course, the time of the least pressure, he had so improved his burners that it was found possible, with a sufficiently large service, to give a supply of gas which would be ample to heat the oven.

Mr. Isaac Carr (Widnes) asked what would be the cost of applying the apparatus to ordinary bakers' ovens. Mr. Booer had, he said, stated that the cost of making bread in the gas-heated oven was 9½d. a batch. He should like to know how this figure compared with the cost of baking a batch by means of coal in the old-fashioned way.

Mr. R. Fish said that he had had the pleasure of examining the method described for heating bakers' ovens with gas, and he was fully satisfied as to the merits that were claimed by Mr. Booer. One noticeable feature related to the difference which the process made in the weight of the bread; in fact, it had been said that there was an actual gain of weight by the process. On one occasion Mr. Booer's assistant had told him (Mr. Fish) that there was a gain of about 1¼ oz. in the weight of a 4-lb. loaf. This, however, was not quite clear to his mind; because, if bread was baked at a given temperature, one would naturally suppose that there would be an equal evaporation taking place whichever process was being used. This was a point which he thought ought to be cleared up; and no doubt Mr. Booer would be able to give an explanation of it.

Mr. Denny Lane, referring to the observations of the last speaker, said that he had heard the statement that if the same quantity of bread was put into an externally-heated oven and in an oven heated internally with gas, a greater weight would come out from the gas-heated oven than from the oven which was heated externally; and he began to wonder what could be the cause of the difference. The opinion which he had formed on the subject was that, if the oven was heated externally, the air inside became "thirsty" for moisture; and, the higher the temperature of the air, the larger would be the quantity of moisture which it could hold in solution. In an externally-heated oven, there would be no means of supplying the moisture to the air. On the other hand, in the case of an oven heated internally by gas, all the hydrogen that was burnt was converted into water in the oven; and, therefore, it so far satisfied the "thirst" of the heated air—as it were, slaked it. He could, therefore, see a scientific reason why there should be a larger quantity of moisture in the one case than in the other. The same result might occur in Mr. Booer's oven, as the same principles would be present—by the act of combustion they generated water in the gaseous state. He (Mr. Lane) was sorry to differ from Mr. Livesey upon one point; and that was as to the desirability of supplying gas at a reduced price when it was to be used for purposes other than illumination. He thought there would be good reasons for selling gas at a lower price, if such a concession would lead to increased consumption. One reason was that it would give additional employment to men and meters; and practically extend the gas holding power of the works. If the quantity of gas which was made was distributed more evenly over the twenty-four hours, they would require less gasholder room in proportion to the annual consumption. Another point to which Mr. Booer had referred was one which his (Mr. Lane's) company were always ready to meet; and that was the objection on the part of the bakers to an increased outlay of capital. His company either provided them with the apparatus and charged the bakers an annual rent; or they supplied the apparatus, to be paid for in twelve instalments, spread over three years. In the latter case interest at the rate of 5 per cent. was charged. But it was calculated only upon the unpaid portion of the purchase-money; so that the quarterly payments diminished until all the instalments were paid. When an annual rent was charged, it was calculated upon the following basis: For depreciation, 10 per cent. on the apparatus; 4 per cent. for interest on money; and 1 per cent. for insurance. He believed that it was good policy to encourage the bakers in this way. The gas companies thus obtained interest on their money, and had a provision against depreciation; and if the thing succeeded they had a new outlet for their gas, and hence additional profits.

Mr. W. J. Warner (South Shields) said that in his district there was a very poor field indeed for the application of gas for baking. Most of the people baked their own bread; and consequently the baker was, to a great extent, dispensed with. In Shields a short while ago there was a small shopkeeper, who was in the habit of baking bread for his customers, who thought a large-sized gas stove would answer his purpose well. His wife, however, objected; but on one occasion she happened to be absent from home, and he (Mr. Warner) persuaded the husband to put up a gas stove for doing the baking. A stove was fitted up in the wife's absence; and shortly after she returned she was asked whether she would like to have it taken down. She replied, "Certainly not; the bread is greatly improved by the new method of baking it." When this was known among the general dealers who made bread for their customers, there was quite a run upon the gas-stoves suitable for the purpose.

Mr. G. E. Stevenson (Peterborough) said that any application of gas which would demand a large consumption was naturally of a fascinating character to gas companies; and he had no doubt that Mr. Livesey had not said a word too much on behalf of Mr. Booer's apparatus. The method devised for baking by gas was very ingenious; but, of the many difficulties which had to be overcome, it seemed to him that the greatest was the financial one. He should therefore like to ask Mr. Booer for a little more information as to the comparative cost of baking by gas and baking by coal. Mr. Booer stated in his paper that the primary heating of the oven required something approaching 500 cubic feet of gas. At the price which he had taken—viz., 2s. 10d. per 1,000 feet—this would cost about 1s. 5d. He (Mr. Stevenson) had been informed that the cost for heating an ordinary baker's oven by coal in the first instance was 5d. or 6d.; about 1 cwt. of coal being required. If this was true, the cost of gas would be very much greater than that of coal. Of course, there were many advantages to be gained from the use of gas; and these might cause a baker to prefer to pay somewhat more for the baking of his bread. But surely the baker would object to so great a disproportion. Another thing had struck him in connection with this subject. It is now pretty well established that cooking meat by gas was economical when gas was only moderate in price; the reason being that they had now adopted the internal system of firing the stoves, and so utilized the heat directly it was produced. A much smaller quantity of the heat which was developed thus passed away as waste gas than under any other system—such, for instance, as the system of radiated heat. If, in the case of the baker's oven, the bread could be baked during the time that the oven was being heated, would there not, he should like to know, be a much greater economy of gas? Would not the bread be baked in a shorter time, and much less gas be used? He understood that in Mr. Booer's method the same principle was adopted as with coal. The oven was first heated; afterwards the bread was baked; and then the batch was withdrawn, and the oven re-heated. The apparatus was already so ingenious and perfect in its practical working that it seemed to him (Mr. Stevenson) the great point to be now attended to was merely the matter of cost. Gas would, it appeared, have to be supplied at 1s. per 1,000 feet, it order to compete with the present method of firing with coal.

Mr. W. C. Parkinson said there was no doubt that this invention was a very valuable one for ovens already in use; but from what they had heard from Mr. Warner, and from what they knew themselves, they could see that there was a great necessity for a baking oven of a simpler description. At the Health Exhibition there was a baking oven to be seen which had been patented by Mr. Leoni. It was of small size; and was meant for baking bread and pastry and other things. It was heated only by luminous gas supplied at a low pressure. The oven could be heated, and bread thoroughly baked, with a pressure of only 6-10ths of gas. The oven was of such a size that it was portable; and it could be set up in a very short time. Mr. Warner had referred to baking bread in any ordinary meat-cooking stove. This could not be done satisfactorily; for, to bake bread properly, there must be an equal top heat as well as a bottom heat. In meat ovens the heat

was at the bottom; and there was no radiated heat coming from the top, as in the ordinary baker's oven. In Mr. Leoni's oven all the necessary conditions for bread-baking were thoroughly met

Mr. Warner said he thought Mr. Parkinson was under a misapprehension in supposing that the ordinary gas cooking-stove would not bake bread properly. For some years he had used, in his own household, bread baked by such means; and the baking had been accomplished to the satisfaction both of his family and of his visitors.

Mr. A. F. Wilson said Mr. Livesey had pledged himself to the dictum that the price of gas ought not to vary for different purposes, and he (Mr. Wilson) was interested to know the authority for such a statement. He had no strong opinion one way or the other; but it seemed to him that, when gas companies have expended their capital, and they could count upon a revenue from an already ascertained consumption, all the additional consumption which they could obtain might be valued according to the capital required to carry it out. The consumption for bakers' ovens (which might take place during the night) was one that did not interfere with the ordinary consumption for lighting purposes. The price of the additional consumption might be entirely dependent upon the capital charges that it involved. If the cost was less than that of the ordinary consumption, he thought they might fairly consider the advisability of having two prices.

Mr. W. Carr (Halifax) said that he would, with pleasure, at the right time, go into the question of differential rates for gas when sold for different purposes; but to do so now would be a very poor compliment to Mr. Booer, who had laid the Institute under a great obligation by reading his paper. He (Mr. Carr) hoped, therefore, that they would discuss the paper itself; and not go outside it, as suggested by the last speaker. Anything which came as the paper had done, and gave them some further experience of the capabilities of gas for purposes other than lighting, was of very great value to gas engineers. It was something which they have not opportunities of learning in the ordinary routine of their business, and to get any knowledge upon which they must make a considerable sacrifice. He wished to put, more clearly than Mr. Stevenson had done, the question whether Mr. Booer would consider it advisable, in the case of a new bakery being started, to adopt the same method of heating the oven as was adopted at the present time. Like Mr. Stevenson, he felt that the system which had that day been set before them was unsatisfactory. The system of heating firebricks, in order that the heat might again be given out for the baking of bread, was a very crude one, although it was the popular one. It had prevailed for many years; and would, of necessity, be very difficult to supplant by more scientific methods. They had most of them, during the last few years, had experience of cooking by gas; and this ought to influence their opinion somewhat as to the capabilities of gas in this direction. He differed altogether from Mr. Parkinson's opinion, that baking could not be properly done in an ordinary meat-cooking stove. It was true that top heat was necessary for bread baking; but it was wrong to say that this could not be obtained in an ordinary meatstove. In the cooking of tea-cakes in such a stove in the North of England, it was found that by the introduction of a plate of iron, or something of that kind, within a few inches of the upper part of the tea-cake, the effect of "top heat," which Mr. Parkinson had suggested as necessary for the proper equalization of the temperature all round the loaf, could be easily obtained. If an equable temperature could be procured in a baker's oven by means of gas, and the baking could be carried on while the heat was being applied, such a method would be more scientific and more economical than that which was now adopted. He should, as he had intimated, like Mr. Booer to address himself to the question whether his system, as described, would be the best practicable one in the case of a new bakery. The point of economy was the principal one, and would inevitably decide the merits of the system as compared with the present practice of baking by means of coal.

Mr. F. W. Hartley said it was a proved fact that bread could be baked in an ordinary cooking-oven. He had found that top heat was easily obtained in such an oven by means of plates arranged in the same way as in the Coffey still. A baker could not, however, be shifting the loaves from shelf to shelf in the oven, in order to get them properly cooked. Time was valuable; and if he had to keep inspecting the loaves and moving them, he would never get through his work. Although gas might be a more costly fuel than coal for such purposes as the baking of bread, yet the saving of labor which was effected by the use of gas, as compared with the use of coal, would more than compensate for the additional cost of the fuel. Mr. Booer might thus be able to show the baker that he would effect a real advantageous saving by using gas.

Mr. J. Somerville (London) said that, some months ago, he had two loaves for analysis, with respect to the sulphur and moisture which they contained. One was baked in a baker's oven heated in the ordinary way, and the other in a baker's oven heated by gas. There was considerably less sulphur in the crust of the bread which had been baked by gas than in that baked in the ordinary coal oven; there was also considerably less moisture. Mr. Booer, in his paper, made allusion to some offensive gases which were present in a bakehouse where coal was used. He (Mr. Somerville) would like to know how the use of gas would remedy this.

Mr. Booer, in reply, said that he thanked the meeting very much for the way in which they had received his paper. Many of the points to which he had to reply arose from an utter ignorance of the baking trade on the part of the speakers. He had been afraid that, in his paper, he had said so much with regard to the processes of the trade, that he would appear to be making his hearers bakers; and he certainly thought that he had given them more than sufficient information to prevent the numerous blunders which had been made by the various speakers. (Laughter and applause.) He thanked Mr. Livesey very much for his kind remarks. It had, indeed, been a very difficult question to which he had of late turned his attention; and although two years ago the baking of a loaf of bread seemed to him to be the simplest thing possible, he had found that it was surrounded by such technical and scientific difficulties that it had required his entire attention ever since, with all the assistance he could get. There could be no doubt that gas had been successfully applied to the existing bakers's oven; and while he wished to call attention specifically to such ovens, he did not wish to say a word in disparagement of the numerous other ovens which were being made for the use of gas. They had to deal with a great difficulty—one which was suggested at the Smoke Abatement Exhibition in 1882. The Secretary of the exhibition remarked that no application of gas had been made to bakers' ovens; and the bakers sent a deputation to the meeting at the Mansion House to ask that such an application might be made. It was principally through the suggestion of Mr. W. R. E. Coles that his (Mr. Booer's) attention was turned to this matter. What they wanted now was not an invention, for they had one; and it had been proved beyond doubt that they could do more in the existing baker's ovens by means of his arrangement than could be done by coal. The difficulty was to get the bakers to adopt his apparatus. The President of the Master Bakers' Association asked him a few days ago what it would cost to fit up two of his ovens for the use of gas. This he considered to be a step in the right direction. The baking trade—more particularly in London—was one of a very cutting nature; as might be supposed when he stated that there were about 3,000 master bakers in London. Many of them had six or eight ovens of the class which he had described; and the expense of fitting up these ovens with his apparatus would be a great consideration to them. Hitherto the leading minds of the baking trade had manifested a great desire to improve the filthy method by which they had been baking. Mr. Carr had asked him what would be the cost of applying the apparatus described in the paper. This would differ very much indeed with the condition of the oven with which they had to deal. They had, for example, ovens varying in capacity from 6 to 14 bushels; or, in other words, from a superficial floor area of 30 feet to an area of 144 feet. These ovens were often found to be in a very bad condition indeed; and new bottoms had to be put into them, and sundry other repairs done, before the gas arrangement could be applied. In the case of one oven which had been working with gas apparatus for the last nine months, he might mention that no sign was shown of any repair being needed. The pressure question had been one of considerable difficulty. The South Metropolitan Gas Company had been good enough to increase their pressure several tenths during one night to aid him to operate upon a single oven. In order to meet the difficulty of the varying pressure, the orifice of the burners and the area of the barrels had been so gauged that the apparatus would work successfully at 6-10ths pressure; and the pressure might be raised to 5 inches without the apparatus being in the slightest degree impaired. With the increased pressure, better results were obtained; the oven was heated more quickly, and less gas was used. The cost of baking by gas, compared with that of baking by coal, was a vexed question. He had been in many bakehouses and made attempts to get a record of the coal used; but he had never succeeded in doing so. The master bakers themselves were undecided on the point. One gentleman had spoken of the price of coal as 5d. or 6d. per hundredweight; but such a price was not applicable to London. Here a hundredweight of coal was about the quantity required for a 10-bushel oven, with a superficial area of 80 square feet; and 1 cwt. of coal in London would cost about 1s. if the baker used what the Government Inspector recommended as the best. The first heating would cost about 1s., and subsequent heatings about 6d. The cost of the subsequent heatings would vary according to their frequency. Less and less fuel was required each time, if the oven was heated often; as what applied to coal in this respect applied equally to gas. Mr. Fish was unable to understand the difference in the loss of weight between bread baked in a gas oven and in the ordinary way; but Mr. Lane had answered this point very well. He (Mr. Booer) had had several opportunities of seeing that the bread came out heavier from the gas-heated oven than from the coal oven. Bread baked in a coal oven had a very thick crust formed at the bottom. The flare from the coal took the form of a curve, and this caused the crown and floor of the oven to become intensely heated in certain parts; and it was then necessary to let the oven

"lie down," which meant the closing of the damper, and the leaving of the oven idle for a considerable time to allow the heat to develop over it. This involved a great waste of time; and one part of his arrangement had been designed to obviate it. When heating by gas was effected, a batch of bread could be put into the oven in 10 minutes after the gas was turned off. He might admit that various gas ovens had been made for the purpose of baking bread; but they did not affect the present question. What they had now to deal with was the existing bakers' oven. As to the differential rates for the supply of gas, he had been told so repeatedly that he must not take them into consideration, that he had not troubled himself with the question. He had taken things as they were; and upon this basis he had attempted to bring out his arrangement. If there was a saving at all in the weight of bread in consequence of the use of gas, which was owing to a thinner crust being formed through the better diffusion of heat, and if there was a saving in the wear and tear of the oven, they were perfectly justified in taking these points into consideration in the application of gas to bakers' ovens.

The President said he was sure the meeting must have listened with great pleasure not only to the paper, but to the very interesting discussion which had followed. The question of baking bread by means of gas was one in which he had taken great personal interest during the last two or two-and-a-half years. He had on several occasions seen various schemes which Mr. Booer had introduced for heating bakers' ovens by gas. Mr. Booer's first idea was the construction of a special oven heated externally—such as was exhibited at the Crystal Palace last year. One difficulty, however, in connection with such an oven was the cost of the gas consumed. But the principal one was the disinclination, or inability, on the part of bakers to pull down their old ovens and erect new ones. Mr. Booer had, therefore, very justifiably turned his attention to the most economical manner of using gas in connection with the existing ovens; and he had succeeded to a very great extent. There appeared to be some little difficulties in connection with the cost of the gas; but these might be overcome when the extreme convenience of gas was taken into consideration. The heating could be done much more cleanly and rapidly by gas than by coal. Heating by coal, as had been said, was a very filthy process. The question, however, for them, as gas engineers and managers, was how far they could apply the principle which had been laid before them by Mr. Booer. The London Gas Companies had given Mr. Booer facilities for introducing his system; and these facilities had been that the companies had undertaken, in one or two instances, to pay the cost of introducing the system. He (the President) would commend to them all the consideration whether they could not do something of the same kind to encourage the bakers of their several towns to try gas. They might persuade the directors of their various companies to undertake to pay the cost of introducing the system into one oven at least, to act as an example to others. He thought such a measure would tend to the spread of the system, and the consumption of a very large quantity of gas.

Anent the Sawdust Gas Question.

By J. E. Bicknell.

It was brought to my notice through reading the last number of the Journal, that Mr. Walker is again at a loss to understand the *modus operandi* of my process for producing illuminating gas from sawdust, a partial account and description of which has appeared at various times in your pages.

Now, Mr. Editor (and I also include your many subscribers) I beg you to bear with me this time, as I am thoroughly alive to the fact that this discussion may become a trifle monotonous, except to those directly interested; and, did I not feel doubly positive of the correctness of my statements, would forego even the privilege of closing the argument.

First Mr. Walker states that he does not manufacture residual products at the expense of either the quality or quantity of the gas; but, in common with coal gas manufacturers, produces the largest quantity of gas consistent with illuminating power, and at the same time, accepts any residual products that may be evolved during the process. Now, I would like to ask, what gas manager would not—if it were possible—make 20,000 cubic feet of gas, and little or no ammonia and tar per ton of coal, instead of 10,000 cubic feet of gas and the usual yield of tar and ammonia—the cost of production in each instance being about the same? If such a thing were possible, would not the gas man who followed the latter process be in reality manufacturing residual products at the expense of the gas? The same follows in the case of sawdust gas.

If Mr. Walker will carefully peruse my article contained in your issue of June 16th, especially the quotation from "Ure's Dictionary of Arts and Manufactures," he will find no difficulty in convincing himself that I have not relied upon my own process in proof of the fact that gas of 12 candle power can be produced with the carbonizing heat of the retort raised to a temperature of 1,000° F. I here call attention to the quotation given before as follows:

"If, however, the *gases* and *vapors* produced, as above, be heated to a considerable higher temperature, the volume of permanent gas is considerably augmented, whilst such an amount of hydrocarbons is produced as to render the gas actually richer in these constituents than coal gas," etc., etc. Muspratt, Watts, Roscoe and Schorlemmer state in substance the same thing, as also does Gmelin—the phraseology differing slightly in the latter authority.

From the above it will be seen that it is not necessary, neither is it profitable, for various reasons, to subject the wood to the high temperature mentioned by Mr. Walker, provided the gases and vapors be superheated.

It is a matter of little importance that all of the minor mechanical details necessary to produce this result be given at the present moment, even were I so disposed. Regarding the quantity of gas stated as being produced from a given quantity of sawdust by my process I will say that, in order not to exaggerate, and being especially careful to state what could be taken as a safe basis for estimating the value of the process under any circumstance, and in any locality, I presented the minimum results. Nevertheless it may be advisable, considering Mr. Walker's credulity, to say that results nearly twice those given have been arrived at, and I anticipate even better working for the future.

Were it necessary to carry the high heat, mentioned by Mr. Walker, upon the carbonizing retort, it might possibly be impracticable to make any very radical change in the form or shape of the retort found by experience to be the most advantageous when manufacturing coal gas. Still there would be some serious objections to this which I think would more than counterbalance the advantages.

Mr. Walker says that the capacity of his apparatus will depend solely upon the number of retorts employed. Well; I can say about the same for mine! Of course, without going into any abstruse system of calculation, if one retort produces 117,000 cubic feet of gas, two ought to produce closely on to 234,000 cubic feet. It is an obvious fact that the amount of labor required does not increase, in either case, in the same proportion as the number of carbonizing vessels increases.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Gas Matters at Louisville, Ky.—Certain gentlemen connected with the management of the Louisville (Ky.) Gas Light Company—indeed without mentioning any names (Kentuckians are so modest that they do not like to see their names in print) we might say that they were the highest officials of the company—came on to the East with a view of determining a few points, regarding the wonderful cheapness with which water gas could be made, and the further object of getting figures and estimates from Eastern manufacturers on a list of extensions that the Louisville folks proposed to make on their plant in order that they might be placed in position to comply with the demands that are certain to be made upon them in the shape of increased consumption of gas during the coming winter. The Louisville visitors had no lack of importunities from the possessors of patent rights, all the water gas blowers being accorded an impartial and a patient hearing. The result of the investigation was rather in accordance with that experienced by a well-known San Francisco (Cal.) capitalist and investor in gas stocks on the Pacific slope, when on a somewhat similar visit to New York, in the Spring of the year 1875. This gentleman had been deputed by a number of fellow operators to come East and make a thorough survey of the many details associated with the best practices pursued in the art of gas making in this section of the country, and he was further instructed to interview the several owners of patented appliances—such as improved machinery, in the line of exhausters, retorts, purifiers, and so on—the object of the whole investigation being to enable his principals to build a gas works, in a certain city on the Pacific slope, which would lack in no particular, when constructed, if ever it should be, the pleasant status of being in accord with all that was perfect in the line of gas works building. The gentleman called at our office immediately upon his arrival in New York, and unfolded his plan of operations; he said his tour would probably occupy from two to three months, and added that when on the way back to his far Western home, he would tell us the outcome of his investigations. Well, when the time was up, our visitor kept his word, and dropped into the sanctum. The first question we asked was "What have you seen in the line of improvement; and are you satisfied with the result?" "Satisfied! I should think so. My trouble is all over. I have seen most of your inventors, and examined their processes, patents, etc., and here is just about how the matter stands. Should I determine to adopt everything that I have examined, not only would my gas cost me nothing in the holder, but it would actually owe me 25 cents per thousand cubic feet. I should be 'blessed' hard to please if that state of affairs did not quiet my hitherto uneasy mind." The strangest part of the whole thing is that the plant was never put up. The Louisville folks did not have quite such good look as that was, but they evidently seem

to think that coal gas is a good-enough product to manufacture for the future. To carry out the system of extensions proposed necessitates an expenditure close on to $75,000; and we herewith give a few details respecting the principal features of the new work. The plant will be made in every respect a full twenty-inch one. The exhausting, condensing and scrubbing room will be 100 ft. × 40 ft. in the clear, and 25 feet high from the floor line, with a ten feet cellar, and (in order to prevent a recurrence of the scenes of 1883-4) all above the high water line of 1884. The company will set two No. 6 Root exhausters; one Petouze and Audouin condenser; two multitubular condensers having six square feet per 1,000 condensing surface; also, one "Standard" washer scrubber. This system of apparatus will cover a daily make of 1,500,000, and due provision has been made to duplicate scrubbers, condensers, etc., which is sensible and proper. All the pipes of the system, as far as practicable, will be carried in the cellar, the valve sytems, in appropriate stands, rising through the floor. In the purifying plant a set of 20 feet square boxes are being added to those now in use, and the old connections are being enlarged from 12 to 16 inches. The Isbel valve system is also to be adopted. Oxide is to be used in three boxes, and the fourth (as catch-box) will be kept in lime. A great amount of labor is being done on the street mains, in the way of enlargements and extensions; indeed, when all the work is finished the Louisville plant will be a really model one. The contract for the major portion of the improvements was awarded to the Smith & Sayre Manufacturing Company, of New York city, and the name of the firm is a sufficient guarantee of the thoroughness with which it will be executed. We suppose it is well known that some of the "public benefactors" are trying to make trouble for the Louisville people. Why a charter should have been granted an opposition company in that city really passes our comprehension. The city owns a large financial interest in the old company, and one naturally would expect to see the city authorities anxious to protect an investment which has always earned good interest. Furthermore, the street lights of the city of Louisville are furnished with gas at net cost as determined from the books of the company. Perhaps the water gas prowlers are going to give it away; and, if they are, they should be allowed to begin immediately. We do not know of a better way to let the wind out of their bellows than this. Work progresses rather slowly on the opposition plant, and principally consists of main laying and work on the holder; although we believe some few legal complications still stand in the way which must be settled before the "black flag" can be said to be fairly hoisted. The management of the Louisville Company is in active and energetic hands, and if intelligence, fairness and honesty are to win the day it is not hard to predict who is to conquer. In speaking on the topic of cheap gas in the last issue we did not attempt to give all the instances of where the rates were low, and only mentioned those that came to mind first. Louisville might be justly classed as a good exemplar of the question of cheapness, as (before stated) the streets lights are supplied at net cost, and private consumers are charged but $1.80 per thousand cubic feet.

Passed Over the Mayor's Veto.—At the regular meeting of the Chicago (Ill.) City Council, held on Monday evening, August 4th, Mayor Carter Harrison read his veto message of the ordinance passed on the 28th of last July, by which ordinance the city was to close a contract with the Chicago Gas Light and Coke Company to pay it for lighting the streets on the North and South sides of the city proper, at the rate of $1.65 per 1,000 cubic feet of gas, for the first seven months of 1884, and at the rate of $1 per thousand for the remainder of the year; also, to pay it $32,000 for cleaning the street lamps for the same period, and further that the lighting time-table for all sections be charged so as to conform with that followed on the West side. The Mayor rather illogically claimed that as private gas consumers were being supplied with gas by the company at the rate of $1 per thousand, the simple fact that the city had begun on a new year without notifying the company, or formally entering into a contract for its light supply, did not bind the city to pay the same rate as last year, until such time as the price was adjusted. He thought the price agreed upon for the lamp cleaning service was excessive, and gave it as his opinion that the proposed time-table would entail an enormous waste of gas. A lengthy debate ensued, but the vetoed ordinance was finally passed over the Mayor's objections. There were 36 members present, and 24 voted to override.

Gas Tanks on Steamboats.—Local Steamboat Inspector Fairchild, when recently spoken to on this subject, said that the question of the proper construction of gas tanks on steamboats, which had been long under the consideration of the inspectors, was not involved in the matter of the recent explosion of gas which caused (in the subsequent conflagration) the destruction of the depot of the Pennsylvania Railroad Company in Jersey City, on one evening last week. The inspector put forward the statement that that explosion was caused through gross carelessness in placing a light in a receiving tank before the gas was fully exhausted. Continuing, on the subject of gas tanks on steamboats, Mr. Fairchild said:

"The steam vessels which we inspect have become much more safe than they were a few years ago as far as the position of the tanks is concerned. We at one time thought it would be necessary to have the tanks placed on the upper decks, but that does not seem essential if other precautions are taken. Most of the steamboat owners have now complied with the requirements, and have placed the tanks between bulkheads of iron or of wood lined with iron. These will prevent the gas from escaping even if the tanks should leak. Some of the Staten Island ferryboats have the tanks placed in a sort of box with escape pipes, so that in case of a leak the gas will find its way into the open air in such a manner as to do away with the possibility of a dangerous explosive mixture. Some of the ferryboats have adopted the incandescent electric lights, which, I think are safer. The owners tell me that the electric lights are as cheap as gas."

Inspector Fairchild, no doubt, tells the truth when he says that the owners of the boats, on which are installed the incandescent electric lights, say that these lights are as cheap as the gas lights formerly used. The owners of these vessels are not apt to confess that they made a mistake when changing from gas to electricity, since they have already incurred the expense of fitting each vessel up with the necessary electric appurtenances, and are now making the best of a bad bargain. We suppose that even Inspector Fairchild is open to correction, and possibly to conviction. Actions speak louder than words, according to the proverb; and here is a case which we think decidedly negatives the statement regarding cheapness. Some two years ago, when Congress enacted certain regulations as to how gas-storage tanks should be placed in vessels, the Union Ferry Company, a corporation operating at least 20 double-ended passenger and freight transportation boats on the East River, a stream of water dividing New York city from Brooklyn, went into the lighting question very thoroughly at the time. Among other experiments they fitted up one of the boats with a complete electric plant, and determined, should the trial result in a demonstration that the incandescent electric lighting service was equally as good, commercially and economically, as the gas system then in vogue on the boats, the former plan of lighting would supersede the latter. The experiment was fairly carried out, and the result was that the electric system never extended beyond the experimental stage. Of course, the trial boat still remains lighted by electricity, as the plant that was purchased (at a good round sum) had to be utilized. It should further be added that the general system of gaslighting pursued on the boats was altered and improved, so that nearly twice as much gas is now consumed than the amount formerly burned. Yet it is found cheaper and better to use this greatly increased gas consumption, than to resort to a general introduction of the "light of the future."

Probability of the Formation of another Association of Gas Engineers.—In our editorial columns will be found a call, signed by no less than 24 gentlemen connected in various capacities with the gas interests of the State of Ohio, which has for its object the formation of an Association for the advancement of the business of gas making. It is not the intention of the gentlemen most prominent in the movement that the new body shall in any way clash with the American or Western Associations; the main object, indeed, is a wish and desire to gather together, for purposes of mutual benefit and improvement, representatives from the smaller companies of the State, and particularly such as feel unable to send delegates to the annual meetings of the parent associations, on account of the time which must necessarily be taken up in attending the sessions of the older bodies. The intention, as we understand it, of the progenitors of the new movement is to meet some two or three times in a year, and that the deliberations of each session shall not extend over one day. We hope the plan will meet with the success that it deserves, and that the 17th day of September will see a large and enthusiastic gathering assembled in the city of Columbus.

Who has had Practical Experience in Running Exhausters with Gas Engines?—A correspondent writes us as follows: "Mr. Editor—I have long been anxious to put a gas engine to work (our town is a small one), as a practical example to the people of our place of the capabilities of such a motor power. We have no work for one, however, about our works, unless it be to run the exhauster. Diligent inquiry among the gas works in the territory around us has failed to discover a gas engine run for that purpose. One of our stockholders, now traveling in Europe, writes our President that he has seen on the Continent many gas engines employed driving exhausters. I would like to make the inquiry, through the columns of the Journal, if gas engines are employed to run exhausters taking gas directly from the hydraulic main. I hope that some information may be vouchsafed on the subject. Very truly, C. C. G." In some places in this country gas engines have been so employed, but, we are inclined to believe, not with much success. Should any of our readers desire to give their experience in relation to this subject, we shall be glad to furnish space for their communications in our correspondence columns.

CHEAP GAS IN THE WEST.—Among other places in the Western portion of the United States where low rates prevail in the selling prices of gas, the city of Columbus, Ohio, might well be mentioned as a "shining example." The rates which have ruled there during the past 16 months are as follows:

Gas supplied to the city .....$1.15 per 1,000 cu. ft.
For that furnished ordinary consumers.... 1.25 " " "

The Nashville (Tenn.) Gas Light Company also sells gas at a fair rate; and the gas furnished the city is sold at an extremely low price. Here are the figures:

To the city .....$1.05 per 1,000 cu. ft.
To ordinary consumers..... 2.10 " " "

DEATH OF MRS. THOS. A. EDISON.—The distinguished American electrician and inventor, Mr. Thos. A. Edison, has met with a severe loss in the untimely demise of his estimable wife. The sad event occured on the date of Saturday, August 9th, and the suddenness of decease, together with the youth of the victim (she was only in the 29th year of her age) make a more than ordinarily sad case. The funeral services were held at Menlo Park, on August 12th, the Rev. Mr. Mason celebrating the ceremonies, and the interment was made in Claremont Cemetery, Newark, N. J. The deceased lady was a great social favorite, and deservedly so, as she possessed all the attributes that go to make up the perfect woman. We exstend our sincere condolence to the afflicted scientist.

CHEAPER GAS FOR JACKSON, MICHIGAN.—At a recent meeting of the board of directors of the Jackson (Mich.) Gas Light Company it was unanimously resolved that, on and after date of August 1st last, a discount of 50 cents per thousand cubic feet of gas consumed, as shown on index dial of meter, would be made from the former ruling price of $2.50. This discount will apply only to such accounts as are settled on or before the tenth day of the month in which the bills are rendered. The announcement note containing the statement of reduction says, "This discount is made for the purpose of increasing the number of gas consumers, and encouraging prompt payment of bills." That is the way to talk, and that is the way to act. The consumption of gas will be increased, and settlements will be promptly made. Good for the Jackson folks; they will "put money in their purse."

AGITATORS "GO UP."—Between 12 and one o'clock on the morning of August 6th, the residents of that portion of Brooklyn (N. Y.) known as the 17th Ward were thrown into a state of considerable excitement by the explosion of an agitator in the yard of the Brooklyn Oil Works, located on Ash street and Newtown Creek. An alarm brought out the entire fire department to the scene of the conflagration, and the flames were soon extinguished, although not before considerable damage had resulted. No one was injured. The people of that part of Brooklyn had plenty of reason for excitement, as this same sweet smelling concern was entirely destroyed by fire some two years ago; and many of the nearby dwellers were rendered homeless through the destruction of their tenements. Not only on that occasion was damage done by the flames, but several valuable human lives were lost. Is it not time that these refining establishments were driven out of densely populated districts?

THE ROCHESTER (N. Y.) GAS LIGHT COMPANY REDUCES THE PRICE OF GAS.—The Rochester Gas Light Company is now furnishing gas to ordinary consumers at the rate of $2 per thousand cubic feet. This is a reduction of 10 cents per thousand, and goes to show that the man at the helm of the Rochester Company is shaping his course in the direction of smooth water.

DENVER (COL.) ALDERMEN ON THE QUESTION OF A NEW COMPANY.—At a meeting of the Denver (Col.) City Council, held on July 30th, one of the topics under consideration was whether an ordinance should be passed granting the United Gas Improvement Company the right to establish and operate a gas works in the city. We had thought that the scheme to blackmail the Denver Gas Company had been "knocked on the head" some time ago; and now it seems the interested parties were "not dead, but only sleeping." The ordinance terms were read before the Council, and the provisions of the same differ in no manner from the usual stereotyped clauses—cheap gas, high candle power and a bubbling zeal to deliver the gas consumers from the monopoly that has so long oppressed them. When the reading was finished discussion ensued as to the price proposed to be charged, and it was finally agreed that the figure should be placed at a maximum rate of $2 per thousand, and it was further determined that a provision should be inserted setting out that a forfeiture to the city would ensue of all rights and franchises when granted, together with whatever plant, etc., should be constructed, if the company failed to faithfully carry out the pledges made at the inception of the enterprise. When the whole thing had been gone over, a motion was made to suspend the rules and pass the ordinance. This was lost. Alderman Mathews then moved to refer the ordinance to the committee on printing, with instructions to report at the next meeting of the board; and this course, being the regular order of procedure under the rules, was followed out. The whole scheme has a queer look, and we hardly think that success will finally attend the efforts of the "United gentry" in their endeavor to mulct either the Denver gas company or the Denver gas consumer. Why we venture to think in this manner, despite the fact that similar efforts in other localities have met with some measure of success, is that the policy followed by the old Denver Gas Company has been straightforward and honest; and further, we fail to see how the Councilmen of that city could satisfactorily explain to their constituents why it should appear as a beneficial measure to charter another gas company and allow the newcomers to charge the maximum rate of $2 per thousand, when the already established company does not assess even its most ordinary customers at a higher figure. The gas prices as at present fixed by the old corporation (and these prices have been in operation quite some time) are about as follows: The largest class of consumers including all gas supplied to stoves, engines, etc., pay at the rate of $1.80 per thousand; the second class (embracing a monthly consumption between certain figures that have escaped our memory) are supplied at the figure of $1.90; while those in the third category (no matter how small the consumption) get their light for $2. Then to this must be added the further fact that the illuminating power of the gas sent out averages over 20 candles. Now, we have never had any great respect for the intelligence displayed by the usual run of city councilmen; but if the Denver board allows this thing to be consummated, that eminent body of virtuous and intellectual public servants should at once be awarded the palm for ignorance and thorough-bred stupidity. Still, who knows, perhaps it is not so much a case of ignorance as it is of downright treachery to the custody of the trust reposed in them by the people who selected them as their representatives.

A TESTIMONIAL FROM THE EMPLOYEES.—In our issue of July 2d, we announced that Mr. Chas. R. Faben would resign from the position of Engineer to the Milwaukee (Wis.) Gas Company, on August 1st, and the resignation duly went into effect on that date. On July 30th, between the hours of one and two o'clock, P.M., the engine room of the Milwaukee works was the scene of a pleasant episode that tended to show the relations that had existed between Mr. F. and his workmen during the last seven years. The employees were gathered together in a semi-circle in the engine room, and the presence of their wives and children lent an additional effect to the proceedings. When Mr. Faben made his appearance the assemblage was called to order by Ald. Delaney, who announced the purpose of the gathering in a few well chosen words. Resolutions of esteem were read by John Chambers, the foreman of the retort house, after which Mr. Chambers, on behalf of himself and brother workmen, presented Mr. Faben with a magnificent set of silver ware, that stood displayed on a table close by. The pieces making up the set comprised an ice-pitcher, wine-salver, baking dish, punch bowl and nut basket. Each article bore Mr. Faben's monogram, and the base of the pitcher had inscribed on it the following sentence: "Presented to C. R. Faben as a token of respect and esteem by the employees of the Milwaukee Gas Company's Works, July 30th, 1884." A copy of the resolutions, encased in a handsome frame, was also presented to the retiring superintendent. In responding to this unexpected evidence of his men's esteem Mr. Faben said: "Boys—" but, his eyes grew moist with tears, and his voice refused to express the sounds which his lips were disposed to give utterance to. His son, Vincent, came to the rescue and, in a feeling manner, thanked the men for their hearty and spontaneous testimonial. Mr. Thos. H. Faben, the retiring assistant superintendent, was then called forward and presented with a handsome merschaum pipe and cigar holder. The recipient expressed his thanks and pleasure, when Mr. Chambers made a short speech in which he again expressed the affection of the men for Mr. Faben, and assured him of their wishes for his success wherever he might go. The ceremonies closed with the partaking of suitable refreshments. This occurrence shows how amicable a relation may exist between employed and employer.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Correction in Regard to a Portion of the Discussion at the St Louis Meeting.

ENGINEER'S OFFICE,
INDIANAPOLIS GAS LIGHT AND COKE CO.,
INDIANAPOLIS, IND., Aug. 7, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In regard to the discussion on Mr. McMillin's paper, as contained in your issue for August 2d, your reporter has put words into my mouth which I did not speak, and omitted to report what I really did say. Mr. Thos. Smith, of Grand Rapids, Mich., desired me to relate my experience with the Livesey and Somerville furnace. I replied, in substance, as follows:

That the furnace had been at work for a year, and that it looked as good as the day I started it. While the old furnace used 36 bushels of coke per 24 hours, the new one used but 24 bushels—with from 8 to 10 bushels of breeze—and carbonized the same amount of coal; that it required no clinkering; that the cost per bench, to put it in complete, over the old furnace, did not exceed $40; that I had erected five more of the furnaces in my retort house; and that it was my intention, as the old-style furnaces gave out, to replace them with the new.

In justice to myself, and also to the furnace, I ask you to be good enough to insert this correction, and oblige, Yours truly,

JAS. SOMERVILLE.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,

PROPRIETORS.

Editor—JOS. R. THOMAS, C.E.

Manager—C. E. SANDERSON.

PUBLISHED ON THE 2ND AND 16TH OF EACH MONTH

At No. 42 Pine Street, New York.

This is a recognized official organ of—

LIGHT, HEAT, STEAM, WATER-SUPPLY,
VENTILATION, SANITARY IMPROVEMENT,
AND GENERAL SCIENCE.

TERMS

SUBSCRIPTION—Three Dollars per annum, in advance.

AGENTS

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BOSTON—S. M. PETTENGILL & Co., 6 State Street.
PHILADELPHIA—PRATT & Co., Corner 9th and Arch Streets.
England—C. W. HASTINGS, 72 Buckingham St., London, W. C.
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SATURDAY, AUGUST 16, 1884.

Personal.—T. F. White.

Mr. T. F. White, of Houston, Texas, who is the mainspring of action in the running gear of the Houston Gas Light Company, has just returned to his home, after spending some time in this section of the country. One of the principal objects of his visit was to inquire into the merits of some of the various water gas processes, the owners of which are never slow in their "mouthings" as to what great advantages they possess, as to cheapness, etc., over coal gas methods, but who at the same time are ever ready to part with territory rights for a "certain merely nominal sum, you know." Mr. White failed to discover, after the course of a critical examination, any of the "merits." Quite the contrary he goes back to the "Lone Star State," with a pretty good insight into the "demerits" of the "wonderful discovery," and more firmly convinced than ever that bituminous coal is a rarely good thing from which to extract "the light of the present."

The Deadly Kerosene.

Notwithstanding the numerous fatal accidents constantly reported as occurring from the explosion of kerosene lamps, but little effort is made to enforce the laws against the manufacture and sale of dangerous grades of petroleum. A more than ordinarily distressing case that has come to our notice is one that happened on August 4th at Augusta, Georgia. A prominent and respected citizen of that city, named John B. Carter, was burned to death through the explosion of a kerosene lamp. Is it not time that proper attention was given to this matter? Still and all, gas is ever ready to furnish a safe illuminating vehicle.

Crowded Out.

We have received an interesting chapter of news in relation to the existing phases of the gas question at Chattanooga, Tenn. We are unable to devote sufficient space in this issue to a consideration of the same, but will make due note of the affair in the number for September 2d.

Regenerator Gas Furnaces.

Mr. S. Hunter, under date of June 2d, 1884, wrote the following letter, from Villa Coretz, Carlsbad, to the London JOURNAL:

"Nearly two years ago the Salford Gas Committee deputed me to visit any or all of the gas works on the continent of Europe, to obtain such information as might be serviceable and profitable to us in the working of our own concern—more especially as to the regenerative gas furnaces. Among other places, I visited Wiesbaden, where I found in course of erection some settings of retorts that somewhat raised my expectations. On my way here, last month, it was my privilege to enjoy a delightful ride on the Rhine steamer, and revel in the luxury of gazing on the continuous line of beautiful and grand scenery. Again, for a change, I looked in at the Wiesbaden Gas Works. Perhaps not such a great change as some might imagine; for the arrangement of the whole works was so good, and the process of manufacture and purification so skilfully carried on, that there was nothing offensive to the smell or sight. There were in the gas-works grounds some things pleasing to both, in the shape of vegetables, flowers and fruits; including some good strong vines that showed signs of an abundance of grapes. But I was most interested to learn the results obtained in working the regenerator gas furnaces, which are on Klönne's system; and was informed as follows:—

"That the principle and system had given unbounded satisfaction.

"That each retort had been used in the make of 7 million cubic feet of gas; and they were in such condition as to give reasonable expectation of a make of 3 million cubic feet more before requiring renewal.

"The size of each retort is 24 in. by 14 in. by 10 ft. long, single settings; and the make per mouthpiece in 24 hours is 12,600 cubic feet of gas, having a specific gravity of .420.

"One ton of coals produced—

10,884 cubic feet of gas.

61.8	per cent of	coke.
5.0	"	breeze.
1.0	"	slack.
67.8	per cent.	

and the quantity of fuel used in the furnaces to heat the retorts was 10.90 per cent. of coke, and 95 per cent. of breeze or slack; making 11.85 lbs. by weight in carbonizing each 100 lbs. of coal.

"I was informed that there were no stopped ascension or other pipes; and, judging by the arrangements for the prevention of such, I can readily credit the statement.

"Mr. Winter, the Managing Director of the gas and water works, is a gentleman highly esteemed by his fellow-townsmen; and he is so thoroughly posted in every detail, that his figures may be accepted without fear of any error. In matters of this sort, I have not, on the Continent, met his equal; and on water questions he certainly excels. The diagrams and and statistics he prepared on the latter subject, and which were at the Frankfort Exhibition (which it was my pleasure to visit), earned for him a certificate of considerable merit, signed by the Empress Augusta. Mr. Winter will, I am sure, be ready to supply any other gas manager, as he did me, with any and every details of interest.

"It is seldom I trouble you with a letter; but the splendid results obtained with the slight wear and tear of the retorts and low percentage of coke required, will, I hope, be a sufficient apology for asking you to communicate, through the *Journal*, the facts to my brother managers."

The Market for Gas Securities.

The market for New York city gas shares still retains the decided aspect of strength and solidity which have been the ruling characteristics for the past two or three months. Manhattan rules steady at the figures last quoted, as also do Harlem, Metropolitan and Municipal. The New York and Mutual shares each score decided gains in value—the advance in bid price being three points in case of the former, and two in that of the latter. Equitable quotations have taken a great jump, and we are more than ever inclined to think that the recent "slump" was due to the manipulation spoken of in our last issue. Certainly Equitable stock is not any instrinsically stronger than it was a fortnight ago, and no developments have been made which would warrant an advance of from 8 to 10 per cent. However, the plain fact is that the figures given show the advance to have been made. The Central Gas Company, of New York city, declared and paid a regular semi-annual dividend of 3 per cent. on August 1st last.

Brooklyn gas stocks are firm to strong, the notable cases of strength being developed in the Citizens and Metropolitan companies. Everything appears to be serene and smooth in Brooklyn gas circles—still we adhere to the opinion that quotations are a trifle too high over there, and fancy the "short" side of the market as most likely to afford a chance for a profitable "turn." The settlement of the question of gas prices in the city of Newark, N. J., has naturally had its effect on the gas shares at that place. Of course, it would be rather hard to furnish a quotation for securities of the Newark Gas Light Company, as these pieces of parchment are seldom found floating around on the financial marts. The Citizens Company shares in the upward movement. The Louisville Gas Company declared its regular semi-annual dividend of 5 per cent., on July 10th, and the shares are now quoted, ex-div., at 116 bid, offered at 121. Consolidated gas, of Baltimore, (Md.) is a shade weaker; Hartford (Conn.) gas maintains its price; Central gas (San Francisco) is considerably higher; St. Louis (Mo.) quotations have straightened out considerably. The situation may as, a whole, be summed up as presenting very encouraging features. For quotations see regular report.

Stanley's Plastering Process.

The London *Builder* in making mention of Stanley's patent plastering process says that the special feature of the system consists in substituting for the usual lathing-key for plaster a fine woven wire with an open mesh, and which is corrugated equal to the usual centre to centre spacing of joists. The wire is fixed with the concave side of the corrugations upwards, each ridge of the corrugation being fixed by staples into the soffit of a joist. The plaster, in laying, is forced right through the meshes of the wire, thus ensuring a very firm key besides placing a sufficient amount of plaster between each joist, behind the wire, to cut off all draught from one joisting space to another, and thus further check the liability to rapid combustion in case of fire, which the plaster itself, on a wire key, will, in first instance, offer considerable resistance to. The liability to the cracking of the plaster from shrinkage of the ground is also much diminished. The process, which is American in its origin, is one of the best substitutes for the antiquated and flimsy lathing system that we have noticed.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & co.,)

34 Pine Street, New York City.

August 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share. ☜

	Capital.	Par.	Bid	Asked
Central	$466,000	50	75	90
Equitable	2,000,000	100	88	93
Harlem	2,000,000	50	121	123
" Bonds	170,000		—	—
Manhattan	4,000,000	50	300	305
Metropolitan	2,500,000	100	230	235x
" Bonds	658,000	—	107	110
Mutual	3,500,000	100	129	132
" Bonds	1,500,000	1000	104	106
Municipal	3,000,000	100	207	210
" Bonds	750,000		107	110
New York	4,000,000	100	160	165
Northern	125,000	50	—	80
" Scrip	108,000			
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	127	129
Citizens	1,200,000	20	90	93
" S. F. Bonds	320,000	1000	106	110
Fulton Municipal	3,000,000	100	142	145
" Bonds	30[illegible],000		104	108
Peoples	1,000,000	10	75	80
" Bonds	290,000	—	105	110
" "	250,000	—	90	95
Metropolitan	1,000,000	100	92	94
Nassau	1,000,000	25	102	107
" Ctfs	700,000	1000	85	90
Williamsburgh	1,000,000	50	115	125
" Bonds	1,000,000	—	104	108
Richmond Co., S. I.	300,000	50	—	75
" Bonds	40,000	—	—	—
Out of Town Gas Companies.				
Buffalo Mutual, N. Y.	750,000	100	80	85
" Bonds	200,000	1000	95	100
Citizens, Newark	918,000	50	105	109
" " Bonds	124,000	—	105	110
Chicago Gas Co., Ills			150	155
Cincinnati G. & C. Co.			187	190
Consolidated, Balt.			51½	52
" Bonds			110	111
Central, S. F., Cal.			52½	62½
Capital, Sacramento, Cal.			—	59
Hartford, Conn	750,000	25	112	120
Jersey City	750,000	20	145	150
Laclede, St. Louis, Mo.	1,600,000	100	100	—
Louisville, Ky.	1,500,000	50	116	120
Montreal, Canada	2,000,000	100	186	187
New Haven, Conn.		25	166	170
Oakland, Cal.			28	29
Peoples, Jersey City		—	75	80
" " Bonds			—	—
Paterson, N. J.		25	96	99
Rochester, N. Y.		50	75	80
Washington, D. C.	2,000,000	20	185	195
Wilmington, Del.		50	178	190
Yonkers		50	—	40
St. Louis, Missouri	600,000	50	—	238
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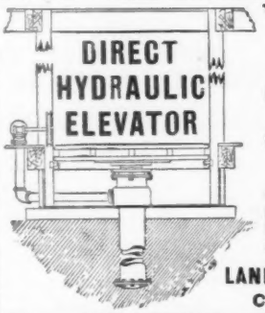

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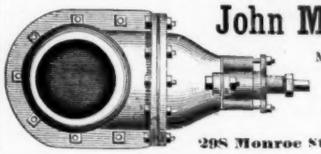

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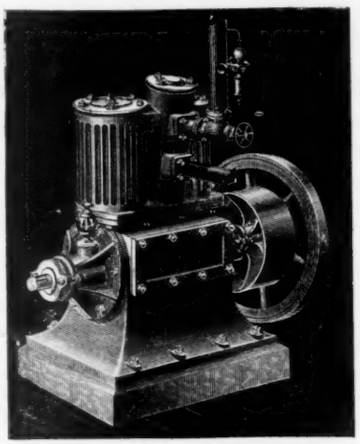

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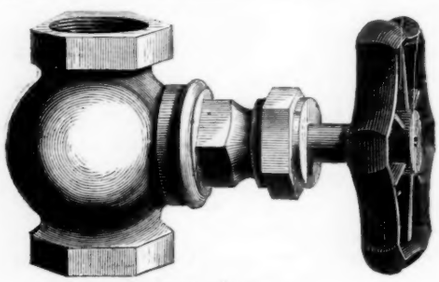

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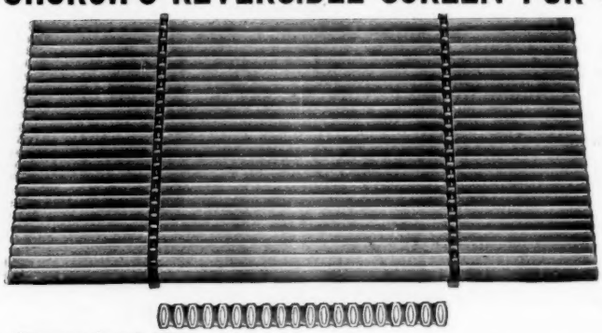

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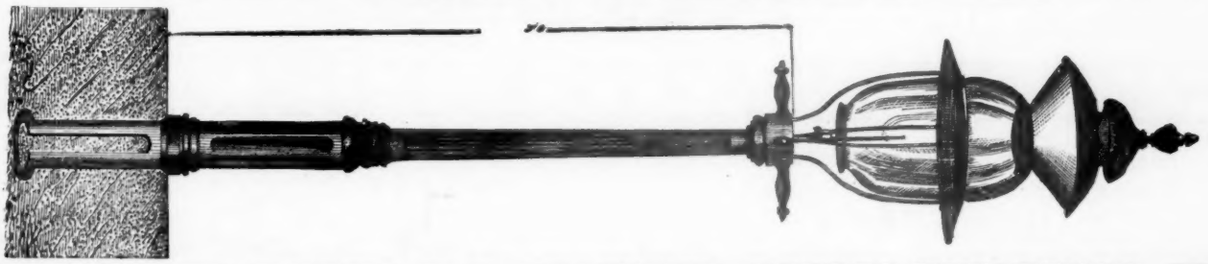

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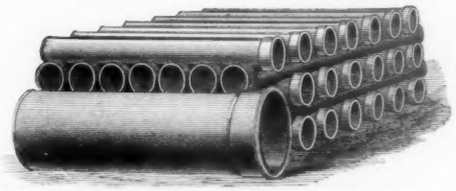

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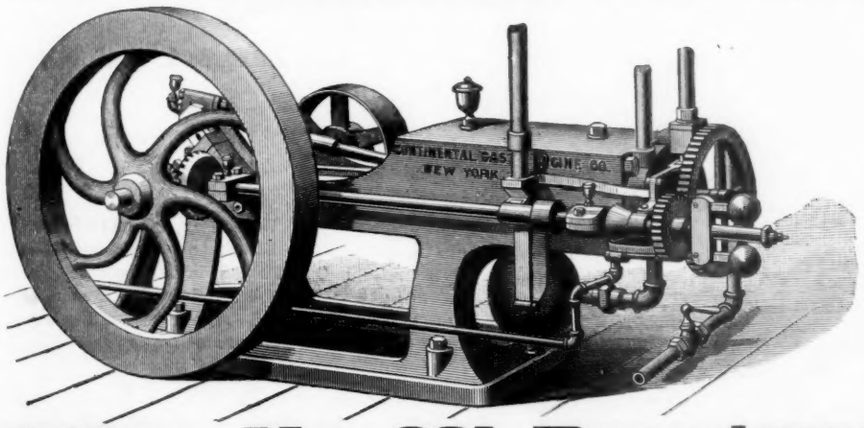

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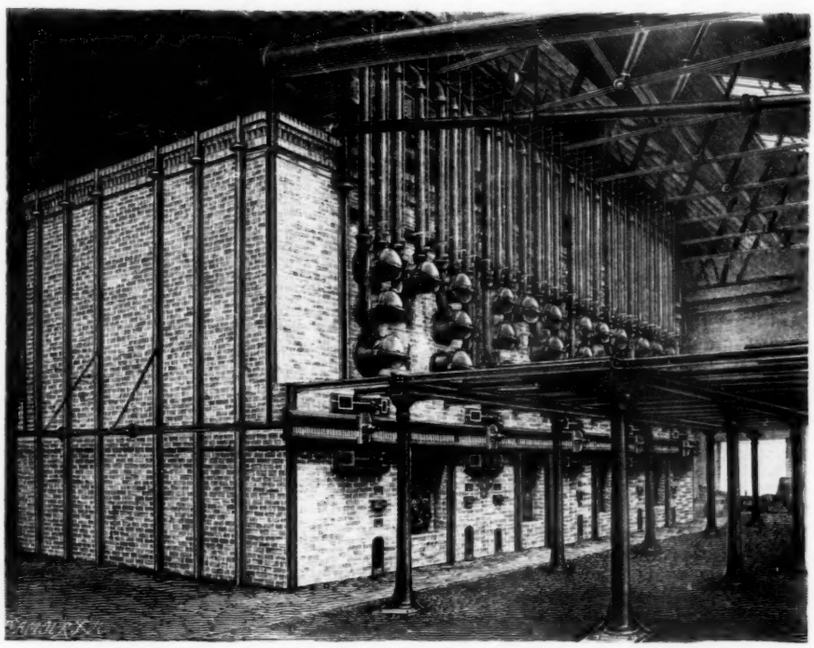
Production per mouthpiece per day (according to the number and size of retorts), 8,000 to 12,000 cubic ft.; fuel used, from 10 to 25 lbs. of coke per hundredweight of coal carbonized; feeding of the generator once in 4 hours, with hot coke direct from the retort into the generator, done in about two minutes; clinkering necessary once in 24 to 48 hours.



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The Manager of the Gas Works, Mr. Winter, informs the Gas Engineer of the facts and results he obtained with the Klonne Regenerative Furnaces which were constructed some years ago. Bench No. 1 in 584 days produced 131,917 cubic meters per retort; Bench No. 2, in 771 days, 169,504 cubic meters; Bench No. 3, in 903 days, 200,317 cubic meters; Bench No. 4, in 154 days, 41,978 cubic meters; Bench No. 5, in 167 days, 42,857 cubic meters. Benches 2 and 3 are still good for another season without repairs. Production, 304 cubic meters of gas per 1,000 kilo. (1 ton) of coal, and 12 per cent. of coke fuel used. The result is, therefore, that benches of 8 retorts have already produced 56,596,161 cubic feet of gas without any repair—a fact never reached in any other gas works or by any other furnace in the world.

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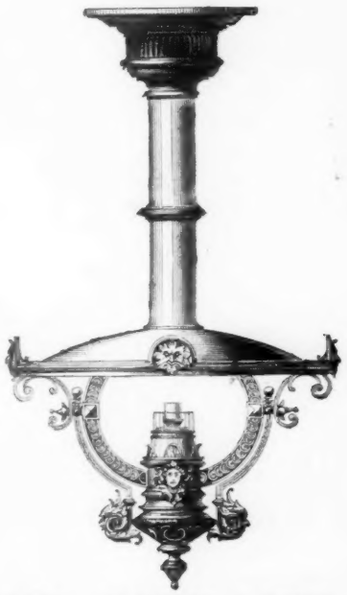

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1880	42,967,500	"
1881	36,462,500	"
1882	39,300,000	"
1883	57,735,000	"
1884	26,177,500	"
Total	235,937,500	cubic feet.

Total Number and Capacity per 24 Hours of "Standard" Washers Erected and in Course of Erection in the Several Countries

	Number.	Cubic Feet per Day.
Great Britain	151	157,070,000
Western Hemisphere	38	39,337,500
Australia	18	12,150,000
New Zealand	2	650,000
France	6	4,550,000
Belgium	8	5,420,000
Germany	16	8,200,000
Holland	4	4,160,000
Denmark	1	150,000
Russia	2	3,500,000
Spain	1	350,000
India	1	400,000
Total	248	235,937,500

"Standard" Washers Ordered During the Current Year.

	Cu. Ft. per Day.
Anneberg Gas Co.	200,000
Bombay Gas Co.	400,000
Brussels Co.	1,250,000
Chemnitz Gas Co.	1,000,000
Coke Works in Zabre, Ober-Schlesien	1,500,000
Cokerei der Friedenshutte, Upper Silesia	500,000
Dumfries Corporation	250,000
Dunedin Gas Co., New Zealand	400,000
King's Lynn Gas Co.	300,000
Leiden, Holland	600,000
Lincoln Gas Co.	400,000
Liverpool Gas Co.	2,000,000
" "	3,000,000
Louisville Gas Co.	1,500,000
Numea Gas Co.	100,000
Pittsburgh Gas Co.	1,500,000
Portland Gas Co., Oregon	562,500
San Francisco Gas Co.	2,000,000
" "	2,000,000
Sheepbridge	40,000
St. Louis Gas Co.	2,000,000
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Whitchurch Gas Co	175,000
Total	26,177,500

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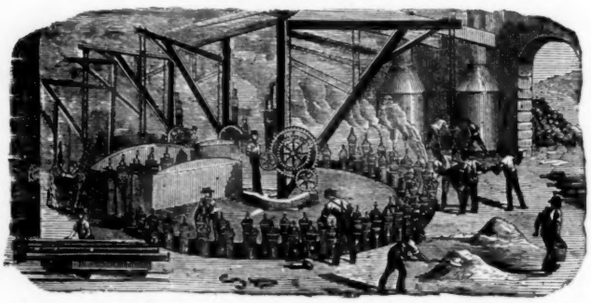

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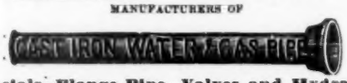

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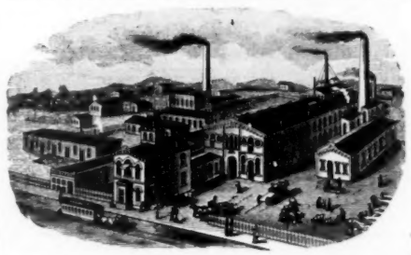

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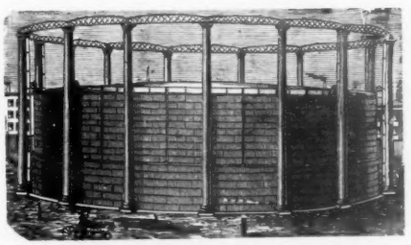

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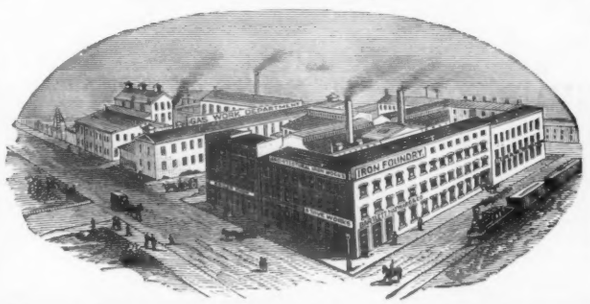

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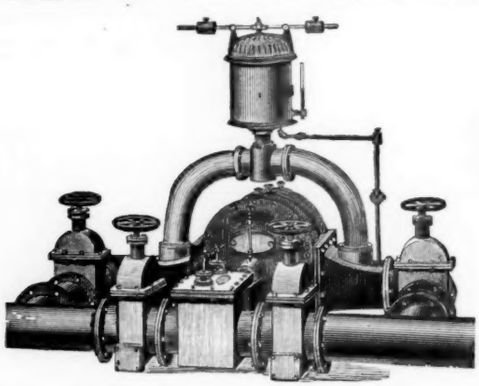

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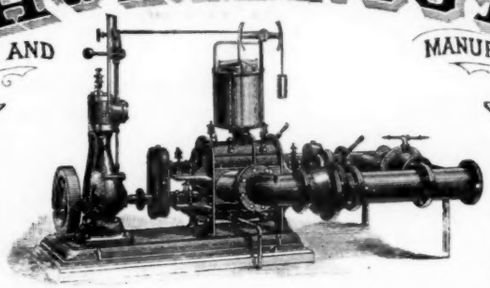

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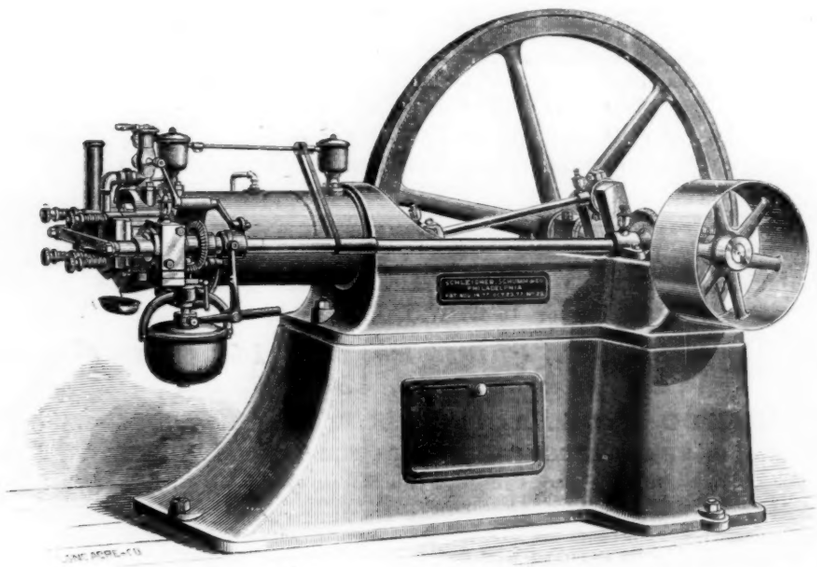

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